HAZARD RANKING SYSTEM (HRS)
DOCUMENTATION RECORD - REVIEW COVER SHEET

Name of Site:	US Oil Recovery	
EPA ID No.:	TXN000607093	

<u>Contact Persons</u>

Site Investigation:	<u>Brenda Nixon Cook, NPL Coordinator, EPA Reg.6</u> (Name)	<u>(214) 665-7436</u> (Telephone)
Documentation Record:	<u>Brenda Nixon Cook, NPL Coordinator, EPA Reg.6</u> (Name)	<u>(214) 665-7436</u> (Telephone)

<u>Pathways, Components, or Threats Not Scored</u>

1) Ground Water Pathway: The ground water migration pathway has not been scored because an observed release to the ground water pathway has not been documented and there are no analytical data to support a release. Based on information available at this time, evaluation of the ground water migration pathway would not significantly affect the listing decision (Ref. 1, Sec. 2.2.3).

2) Soil Exposure Pathway: The soil exposure pathway has not been scored because observed contamination has not been documented on or within 200 feet of soil pathway targets. Based on information available at this time, evaluation of the soil exposure pathway would not significantly affect the listing decision (Ref. 1, Sec. 2.2.3).

3) Air Pathway: The air migration pathway has not been scored because an observed release to the air migration pathway has not been documented and there are no analytical data to support a release. Based on information available at this time, evaluation of the air migration pathway would not significantly affect the listing decision (Ref. 1, Sec. 2.2.3).

4) Surface Water Pathway: The Surface Water Pathway has been scored for the Human Food Chain Threat and Environmental Threat. However, the Drinking Water threat has not been scored. Based on information available at this time, evaluation of the drinking water threat would not significantly affect the listing decision (Ref. 1, Sec. 2.2.3).

HRS DOCUMENTATION RECORD

Name of Site:	US Oil Recovery
Site Spill Identifier No.:	A6X7
CERCLIS Site ID No.:	TXN000607093
EPA Region:	6
Date Prepared:	September 2011
Street Address of Site:	400 and 200 N. Richey Street*
City, County, and State:	Pasadena, Harris County, Texas 77506*
General Location within the State:	The site is located in the City of Pasadena, Harris County, Texas. Pasadena is located in southeast Texas (Ref. 3, p. 1).
Topographic Map(s):	The following U.S. Geological Survey (USGS) 7.5-minute topographic series map was used in locating the site: Pasadena, Texas (1995) (Ref. 3, p. 1).

Latitude/Longitude (400 N. Richey Street)*: 29° 43’ 6.2” N, 95° 13’ 17.5” W

Latitude/Longitude (200 N. Richey Street)*: 29° 42’ 53.05” N, 95° 13’ 11.07” W

Latitude and Longitude coordinates were measured from the northeast corner of the surface impoundment at 400 N. Richey Street and at the middle of the Trickling Filter on the west side of 200 N. Richey Street and were determined using a scaled topographic map and GIS software (Ref. 4, pp. 1-2).

	Scores
Air Pathway	Not Scored
Ground Water Pathway	Not Scored
Soil Exposure Pathway	Not Scored
Surface Water Pathway	100.00
HRS SITE SCORE	**50.00**

*The street address, coordinates, and contaminant locations presented in this HRS documentation record identify the general area in which the site is located. They represent one or more locations EPA considers to be part of the site based on the screening information EPA used to evaluate the site for NPL listing. EPA lists national priorities among the known "releases or threatened releases" of hazardous substances; thus, the focus is on the release, not precisely delineated boundaries. A site is defined as where a hazardous substance has been "deposited, stored, placed, or otherwise come to be located." Generally, HRS scoring and the subsequent listing of a release merely represent the initial determination that a certain area may need to be addressed under CERCLA. Accordingly, EPA contemplates that the preliminary description of property boundaries at the time of scoring will be refined as more information is developed as to where the contamination has come to be located.

NOTES TO THE READER

1. The following rule applies when citing references in this documentation record:

   Tracking numbers are assigned by the region to every page of every reference. The tracking number consists of the reference number followed by the page number within that reference. A tracking number has a two-digit number followed by the sequential number (e.g., Reference 4, page 1 is expressed as 040001in Reference 4).

2. Hazardous substances are listed by the names used in the January 2004 Superfund Chemical Data Matrix (SCDM) (Ref. 2).

3. Attachment A of this documentation record consists of the following figures:

   - A-1 Site Location Map
   - A-2A Property Layout Map – US Oil Recovery Property
   - A-2B Property Layout Map – MCC Recycling Property
   - A-3 Surface Water Pathway Map
   - A-4 15-Mile Target Distance Limit
   - A-5 Sample Location Map

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SITE SUMMARY

The US Oil Recovery (USOR) facility is located at 400 and 200 N. Richey Street in Pasadena, Harris County, Texas (Ref. 3, p. 1, Ref. 5, p. 10, and Ref. 6, p. 10; Ref. 11, pp. 1, 2). The facility is located in a mixed industrial/residential area north of the City of Pasadena, Texas and is depicted on Figure A-1 of Attachment A (Ref. 3, p. 1). One of the properties (identified as USOR on Figure A-1) consists of a centralized waste treatment plant that receives and treats oily waste, sludge, and organic chemical-bearing wastes. The second property (identified as MCC on Figure A-1) consists of two contiguous parcels connected by pipes and bisected by Vince Bayou. The MCC property contains an industrial wastewater treatment plant (WWTP), MCC Recycling, which is connected to the USOR waste treatment property via a 6-inch diameter pipeline. The USOR and MCC properties are approximately 12.2 acres and 4.70 acres in size, respectively (Ref. 5, p. 11; Ref. 6, pp. 11, 13, 52; Ref. 11, p. 1).

The facility is an abandoned used oil processor and wastewater treatment facility. The USOR waste treatment operations at 400 N. Richey Street began in 2002 and the wastewater treatment operations at 200 N. Richey Street began in 2008 when MCC Recycling became a subsidiary of USOR. As part of the operations at the facility, USOR processed non-hazardous landfill leachate, contaminated stormwater, wastewater generated from industrial and non-industrial interceptor traps, Class I and Class II industrial waste (subject under the wastewater treatment unit exemptions), characteristically hazardous waste, used oil and oily sludges, and municipal solid waste (Ref. 5, pp. 62, 286, 305; Ref 7, p. 2; Ref. 11, p. 1). Once accepted, the wastes were treated by de-watering via reclamation of recyclable materials through neutralization of acidic or caustic characteristics and/or by removal of solid materials in the waste through screening, clarification and biological activity.

Once the waste was accepted by USOR, the waste was separated into several concrete pits. Wastewater with five percent solids was sent to the concrete pits to be de-watered and solidified. Solids were materialized with limekiln dust, cement kiln dust, sawdust, and/or filter press operation. Wastewater with less than five percent solids and decant from the other wastewater pits were piped into treatment tanks (Ref. 5, pp. 13, 305). After treatment by USOR, the effluent (an oily water mixture) was piped via pipeline to the industrial WWTP (MCC Recycling) located approximately 0.1 mile to the southeast of the waste treatment operations for further treatment and eventual discharge (Ref. 5, pp. 13, 287; Ref. 11, p. 1).

The USOR property containing the used oil processing and waste treatment operations, also called USOR, is located at 400 N. Richey Street and consists of two buildings and a security guard shack. A one-story office building (approximately 3,000 square feet) is located at the entrance to the property. The second building is a one-story brick and metal rectangular warehouse (approximately 25,000 square feet in size) that is located near the middle of the property. The warehouse includes a laboratory, machine shop, container storage area, and parts warehouse. A tank farm is located at the north end of the warehouse. The tank farm contains approximately 24 aboveground storage tanks (ASTs). A large concrete walled structure that is called the “aeration basin”, also known as the “bioreactors”, is located west of the tank farm. A containment pond is located west of the warehouse and south of the aeration basin. The property also contains 225 roll-off boxes located throughout the property. The property is currently surrounded by a six-foot chain link fence (Ref. 5, pp.11, 24 Ref. 7, p. 10; Ref. 9, p. 2). A Property Layout Map is provided as Figure A-2A.

The MCC property that receives and treats wastewater from USOR is located at 200 N. Richey Street and consists of contiguous properties which include 2.92 acres on the east side of Vince Bayou connected by a foot bridge and pipes to 1.78 acres on the west side of Vince Bayou. The 4.70-acre property was the former location of the City of Pasadena "old" Vince Bayou WWTP (Ref. 6, pp. 11, 45-52; Ref. 12, p. 5). The west plant contains the headworks, a trickling filter, a primary clarifier, an aeration basin (converted from the final clarifier), and lift stations for transferring wastewater from the west plant to the east plant. The east plant has a small gravity thickener near the pump room. The pump room is connected to the aerobic digester tank. Between the aerobic digester tank and the chlorine contact tank is the belt filter press building. Further toward the back of the property is an oxygen activated sludge tank. The remains of a sand filter are next to the oxygen digesters and oxygen activated sludge tank. Two final clarifiers (Clarifier #1 and Clarifier #2) are behind the oxygen activated sludge tank (Ref. 5, p. 311; Ref. 6, pp. 13, 21, 22, 55; Ref. 9, p. 3). A Property Layout Map is provided as Figure A-2B.

The closest residences are located approximately 150 feet south of the MCC property. A community park is located approximately 650 feet southwest of the facility. The topography of the property is generally flat although there is a slight slope across most of the property toward Vince Bayou. The slope increases to a moderate slope between the facility and the bayou. The closest probable points of entry for overland flow to Vince Bayou are approximately 50 feet west of the waste treatment operations at the MCC property and 40 feet east of the USOR wastewater operations property (Ref. 3, p. 1; Figure A-3).

For the purpose of this HRS evaluation, the USOR site includes sources on both the USOR and MCC Recycling properties and the location of releases from the sources into Vince Bayou. The site includes the following eight sources: drums (containing flammable and corrosive wastes); bioreactors; truck bays used as sumps; surface impoundments; poly totes (containing flammable and corrosive wastes); aboveground tanks (ASTs); containment pond; and roll-off boxes. These sources contain hazardous substances that have been or potentially could be released into Vince Bayou, which flows in a northerly direction from the site. Level II contamination, as a result of releases of hazardous substances via overland flow migration and direct deposition, has been documented in both surface water and sediment within Vince Bayou. This contamination threatens a nearby human food chain fishery and sensitive environments.

History

The USOR facility has a history of violations and environmental concerns dating back to the early beginnings of operations as presented in the following paragraphs:

- **December 2003 and January 2004** - The Texas Commission on Environmental Quality (TCEQ) performed a Compliance Evaluation Investigation (CEI) after they received a complaint that alleged USOR of improperly transporting hazardous waste and operating without a permit or proper registration (Ref. 47, p. 1).

- **24 February 2004** - the TCEQ issued a Notice of Violation to USOR. Some of the issues noted included: processing grease trap and grit waste without authorization; emission of strong foul odor; processing industrial non-hazardous liquid waste in its WWTP, and transporting treated wastewater effluent to the Gulf Coast Waste Disposal Authority for disposal (Ref. 47, p. 6).

7 October 2005 - The TCEQ Region 12 Waste Program conducted a sampling investigation at the site (Ref. 5, p. 16). TCEQ had received a complaint that alleged USOR had discharged contaminated stormwater from a pipe located just outside the entrance to the site and dumped tank bottom waste into a manhole located on the southeast side of the property. The manhole was connected to the sewer line used by USOR to discharge treated wastewater to the City of Pasadena (Ref. 5, p. 477). During the site visit, the TCEQ investigator observed a ditch with dark colored water between N. Richey Street and the manhole (located off USOR property). The TCEQ investigator concluded that the water had appeared to overflow from the manhole since the vegetation extending from the manhole was distressed (Ref. 5, p. 477). Soil samples were collected around the manhole. The soil sample results showed concentrations of arsenic, lead, and mercury exceeding Texas Risk Reduction Program (TRRP) Tier 1 protective concentration levels (PCLs) for soil at commercial/industrial sites near the manhole on the southeast side of the site and at the stormwater outfall near the front gate (Ref. 5, p. 477)

- **23 February 2006** - The TCEQ Region 12 Waste Program conducted a site inspection and collected soil samples (samples E-1, E-2, and E-3) from three areas behind the warehouse/processing building on the USOR property The analytical results for these samples showed concentrations of arsenic, barium, lead, mercury, several pesticides including toxaphene, SVOCs including benzo(a)pyrene, and VOCs in exceedance of TCEQ's TRRP Tier 1 commercial/industrial PCL (Ref. 5, pp. 16, 273, 489-492).

- **14 December 2008** - Air samples were collected downwind of USOR. The air sampling results found benzene, toluene, and xylene concentrations exceeding the TCEQ Effects Screening Levels (ESLs) (Ref. 5, pp. 33, 501).

- **17 December 2007** - The TCEQ Region 12 Waste Program conducted a Sampling Investigation at USOR to evaluate compliance with the applicable requirements for industrial solid waste (Ref. 5, p. 17). During the investigation, TCEQ investigators found that an unauthorized discharge of wastewater onto the ground was occurring from cracks in the west wall of the aeration basin. TCEQ took several soil samples (Ref. 5, pp. 17, 338). Two soil samples were collected from approximately three feet from the base of the basin. One soil sample was collected approximately 58 feet away at the north fence line and two other samples were collected on the adjacent downgradient property to the north. Another soil sample was collected approximately 88 feet north of the USOR property (Ref. 5, pp. 17, 338). All six soil samples displayed concentrations of arsenic, lead, and/or mercury above TRRP Tier 1 residential PCLs (Ref. 5, pp. 17, 338).

- **14 March 2009** - A release of hazardous waste occurred from the west side of the bioreactors (Ref. 5, p. 17). According to USOR's spill report, the spilled material migrated north on the property about 150 feet and then outside of the property another 200 feet to the north (Ref. 5, p. 504). Affected soil was excavated and transported off-site to the Fort Bend Landfill (Ref. 5, p. 505). As part of the incident, the two bioreactors incurred partial structural failure. USOR stated that, as of 12 October 2009, 90 percent of the material from the bioreactors had been removed (Ref. 9, pp. 3, 4).

- **May through June 2009** - Personnel from TCEQ discovered several spills from the wastewater treatment property that migrated into Vince Bayou (Ref. 5, p. 312; Ref. 6, p. 14). In each case of the spills discharging into Vince Bayou, there was no evidence of spill prevention measures by MCC Recycling. The frequency of the spills, lack of spill prevention or containment measures, and the unpermitted discharge indicated negligence by MCC Recycling (Ref. 9, p. 4). An NOE was issued by TCEQ due to the unpermitted discharges (Ref. 6, p. 14). On 8 June 2009, a temporary injunction was granted by the Harris County Court for the site to stop receiving wastes until certain conditions were met (Ref. 6, p. 56; Ref. 9, p. 4).

- **August through September 2009 –** A TCEQ Water Quality Pretreatment Program investigator discovered wastewater escaping to the ground from the trickling filter at the MCC property (Ref. 6, pp. 16, 56). This was a non-permitted discharge of wastewater. This investigation found that the wastewater treatment process had been changed with no prior formal notice of the change having been made to TCEQ (Ref. 12, p. 7). At this time, MCC was under a temporary injunction issued by Harris County. The injunction required USOR to cease the intake of wastewater until verification of the structural soundness of operations and proper treatment process could be made by engineers (Ref. 6, p. 56). The injunction further required the outfall located on the east side of the property to be plugged but it appeared not to be (Ref. 6, p. 56). The injunction required the chlorine contact tank to be removed and all open tanks or basins to have a freeboard of at least 18 inches (Ref. 9, p. 4). The requirements of the two injunctions were not met (Ref. 12, p. 5). During this same time, hydrocarbon odors were detected at the headworks, the primary clarifier, the trickling filter, and the aeration basin which are located in the west plant. Septic hydrocarbon odors were detected at the aerobic digester and gravity thickener located on the east side of the site (Ref. 12, p. 7). Harris County Public Health and Environmental Services (HCPHES) issued a violation notice to MCC Recycling LLC in a letter dated 27 August 2009 concerning the odor emissions containing benzene and acetone. The notice also addressed the leaks from the trickling filter and non-compliance issues with the injunction (Ref. 12, p. 7).

- **September through December 2009** - The U.S. Coast Guard issued an Administrative Order to USOR to remove the waste from the bioreactors due to the inadequate structural integrity of the tank and the proximity of the tank to Vince Bayou (Ref. 5, p. 287). USOR placed hazardous waste from the bioreactors in 210 roll-off boxes throughout the USOR site. Each roll-off box contained approximately 30 cubic yards of hazardous waste (Ref. 5, p. 287). In November and December 2009 EPA inspectors observed these roll-off boxes leaking onto the ground. There was no secondary containment to prevent current and future releases of the hazardous constituents contained in the roll-off boxes (Ref. 5, p. 288). EPA collected samples of the waste contained in several roll-off boxes using the Toxicity Characteristics Leaching Procedure (TCLP) analytical method and found that the contents in the roll-off boxes to be hazardous waste, containing benzene, 1,2- dichloroethane, and trichloroethylene (Ref. 5, p. 288).

- **October and November 2009** - HCPHES investigators discovered discharges from the wastewater treatment property in Vince Bayou. A 24-inch ribbed, concrete pipe connected to the property had ruptured and was discovered discharging black effluent into Vince Bayou at a rate of approximately 200 gallons per minute (Ref. 18, pp. 3-6, 11). Samples were collected from the discharging pipe on 27 October 2009 (Ref. 6, p. 341). Analytical results show that the discharged wastewater contained high concentrations of acetone, carbon disulfide, 2-butanone, 1,2-dichloroethane, benzene, 4-methyl-2-pentanone, toluene, ethylbenzene, and xylenes (Ref. 6, pp. 17, 422-432).

- **16 November 2009** - The TCEQ Region 12 Waste Program conducted an investigation at USOR and found unauthorized hazardous waste being stored in the container storage area (Ref. 8, p. 8). The following violations were observed in the container storage area: leaking containers; containers stored in an unsafe manner; universal waste not stored in separate double rows of containers; failure to ensure all containers of hazardous waste were closed or covered; failure to ensure waste was stored in leak free containers; failure to obtain a RCRA permit to store hazardous waste in the aeration basin and in the container storage area; and, failure to prevent the discharge or imminent threat of discharge of industrial solid waste or municipal hazardous waste into the Vince Bayou (Ref. 5, pp. 288-289; Ref. 8, p. 8).

- **2 December 2009** - HCPHES conducted an inspection at USOR where investigators observed a 6-foot pile of soil contaminated with hazardous sludge was observed on the ground behind the bioreactors (Ref. 5, pp. 18, 19). The contaminated soil was generated as a result of the sludge transfer operation from the bioreactors to the roll-off boxes. No protection barrier was observed under the pile of contaminated soil that would prevent runoff from this area draining off-site to Vince Bayou (Ref. 5, pp. 18, 19). Other violations observed included failure to notify TCEQ of the transfer of hazardous waste sludge from bioreactors (C-63 and C-64) to on-site roll-off boxes and failure to mark containers filled with hazardous waste sludge from bioreactors with the accumulation start date (Ref. 5, p. 18-19; Ref. 47, pp. 1-3).

  EPA inspectors observed the stormwater basin overflowing with an oily sheen discharging into Vince Bayou. EPA inspectors observed approximately 200 drums and poly totes in the USOR warehouse. Approximately 20 percent of the drums had hazardous waste labels (Ref. 5, pp. 18, 288). EPA took samples of the drum contents labeled hazardous waste and results confirmed the drums contained hazardous waste. Samples were also collected from unlabeled drums and results indicated the contents contained in the drums were also hazardous waste (Ref. 5, pp. 18, 288). A sample collected from an unlabeled drum contained methyl ethyl ketone at a concentration of 95,400 parts per million (ppm) (Ref. 5, p. 288). USOR did not have authorization pursuant to the TCEQ Waste Permit to store hazardous waste in the warehouse or any other location on the USOR property (Ref. 5, pp. 18, 288).

  EPA inspectors observed that some drums in the warehouse were leaking and badly deteriorating (Ref. 5, p. 289). EPA inspectors observed a shipment of waste dumped directly from a truck to the floor of the filter press room. EPA sampled the waste and found the waste to be a hazardous waste with a flash point less than 140 degrees Fahrenheit (°F) (Ref. 5, p. 289). Hazardous waste was observed leaking from a truck and flowing into the containment pond (Ref. 5, p. 289). Based on records and recent sampling results, EPA found USOR discharged hazardous waste in its effluent to the Pasadena publicly owned treatment works (POTW) from 1 July 2009 to 26 December 2009 (Ref. 5, p. 289). Samples results revealed effluent contained hazardous wastes exceeding the regulatory limit for benzene and mercury (Ref. 5, p. 289). As a result of the inspection, EPA inspectors determined that USOR had received numerous shipments of hazardous waste that USOR was not authorized to receive and/or treat. Shipment of hazardous waste included lead, vinyl chloride, chromium, silver, and at least 50 shipments of metal wastes (Ref. 5, pp. 18, 289).

- **January 2010** - Investigators also found roll-off boxes were being used to store hazardous and industrial waste without authorization by permit and that these containers were leaking (Ref. 48, p. 2). Also during this time, an investigator with the TCEQ Water Quality Pretreatment Program observed unpermitted discharges into Vince Bayou from the wastewater treatment property. A violation was issued due to failure to prevent the unauthorized discharge of wastewater into the waters of the State. Wastewater from the old chlorine contact tank was discovered discharging from the MCC property to Vince Bayou from two unpermitted outfalls on 8 January and 13 January 2010 (Ref. 6, pp. 18, 665).

- **July 2010** - Due to a large rainfall event associated with Hurricane Alex, the HCPHES and TCEQ reported the potential release of hazardous substances to the National Response Center (Ref. 5, pp. 19, 63). As a result of these reports, EPA initiated an Emergency Response and Removal Action on 2 July 2010 at the USOR site (Ref. 5, pp. 62, 63). EPA found the site to be abandoned and that releases of hazardous substances were occurring at the site. Numerous roll-off boxes (labeled as containing hazardous waste) were filled with liquid and overflowing onto the ground which was then flowing off-site (Ref. 5, pp. 19, 63; Ref. 6, p. 64). Several secondary containment areas were overflowing and flowing off-site. The EPA ER team found that most of the drums located in the warehouse were not in transportable condition and the contents of the drums were not labeled correctly (Ref. 5, p. 69). Some drums were found leaking and not sealed with the appropriate lids, bungs, or drum rings. Corrosives were stored in metal containers and containers holding acids and bases were stored side by side in the warehouse (Ref. 5, p 69). Contents in totes located in the warehouse were not consistent with the tote labels and contained flammables and corrosives. The majority of the roll-off boxes were not properly secured and open to weather conditions (Ref. 5, pp. 19, 63, 69, 74-76, 79, 88-89). A containment pond located on the western side of the site was sampled and found to contain 0.0082 mg/L acetone. The aeration basin located on the northwest corner of the property was noted as containing oily waste and its walls were deteriorating (Ref. 5 pp. 19, 74, 327; Ref. 7, p. 2).

  On July 7, 2010, after a release at the MCC facility was reported to the National Spill Response Center by HCPHES and TCEQ, the EPA included emergency removal actions at MCC (Ref. 6, p. 18). During emergency removal activities, three releases were found at the MCC property and remediated as follows:

    - Oily liquid was discharging from the pump house onto the ground and into Vince Bayou. The release was stopped by plugging the pipes that were leaking (Ref. 6, pp. 18, 81, 85, 113).

    - The east plant lift station, also known as Lift Station #1, was discharging liquid onto the ground and into the bar ditch located along West Richey Street and then Vince Bayou. The release was stopped by pumping liquid from the lift station into a frac-tank (Ref. 6, pp. 18, 87, 89-90).

- Liquid from the chlorine contact chamber was surfacing from cracks in a concrete road near the northwest corner of the chlorine contact chamber. The liquid was running across the concrete road, onto the ground, and into Vince Bayou near the northwest corner of the east plant. The release was stopped by pumping liquid from the chlorine contact chamber into frac-tanks (Ref. 6, p. 19, 74, 81, 83-84, 86, 284, 287).

- **2 August 2010** - EPA completed its Emergency Response and Removal Action and the site, which includes both the USOR and MCC Recycling properties, was stabilized (Ref. 5, p. 75). A total of 225 roll-off boxes were secured and 797 drums and 212 poly totes were assessed, inventoried, and segregated. The drums and poly totes were staged in a safe manner in secondary containment areas located inside the warehouse. Placards and painting markings were placed at each containment area according to hazardous characterization. Approximately 392,000 gallons of non-hazardous material was transported off-site for disposal (Ref. 5, pp. 19-20, 74-75; Ref. 7, p. 19).

- **4 November 2010** - HCPHES reported to the National Response Center that an oily discharge was occurring from USOR due to heavy rain. TCEQ requested EPA's assistance on 8 November 2010 after visiting the site and confirming the site conditions. EPA activated the EPA Emergency and Rapid Response Service (ERRS), who arrived on site on 9 November 2010 (Ref. 5, pp. 77, 78). After making a complete inspection of the site, EPA found damaged containers in the warehouse and the overflow and off-site migration of hazardous substances from the USOR site into Vince Bayou (Ref. 5, p. 20, 78, 130-131: Ref. 6, p. 221). EPA ERRS personnel recovered liquids from the north and south secondary containment areas (tank farms), sumps and bays, and from the parking lot. Approximately 410,000 gallons of non-hazardous oily liquid waste was transported off-site for fuels blending/recycling at the Intergulf disposal facility in Pasadena, Texas (Ref. 5, pp. 20, 83; Ref. 7, p. 26). As a result of several tanks leaking in the north tank farm, oily liquids and sludge from the tanks were drained into the containment area. Oily liquids and sludge from the tanks contained high levels of hydrogen sulfide and were neutralized for disposal as non-hazardous waste (Ref. 5, pp. 20, 83), A tank used to store acid was removed from the secondary containment area since the tank was leaking and had damaged the containment area. Concrete was poured into the acid containment area to repair the damage (Ref. 5, pp. 20, 83). A total of nine vacuum boxes of non-hazardous sludge waste and four vacuum boxes of hazardous sludge were disposed off-site. The non-hazardous sludge was disposed at Waste Management Landfill in Conroe, Texas, and the hazardous sludge was disposed at U.S. Ecology Texas Inc. in Robstown, Texas (Ref. 5, pp. 20, 21, 78). To restrict access, safety fence and orange safety net were placed around the warehouse bays. The EPA personnel completed emergency response activities and demobilized from the site on 20 December 2010 (Ref. 5, pp. 20-21, 77-78, 83, 381; Ref. 7, p. 26).

- **March 2011** - EPA Superfund Technical Assessment Response and Team (START)-3 performed supplemental sampling at the USOR site in March 2011. During this time, the following samples were collected: 21 surface water and 21 sediment samples (including 2 duplicates) from within Vince and Little Vince Bayous; 8 surface soil samples (including 1 duplicate) from overland flow pathways at the site; and 10 waste samples from identified sources at the site (Ref. 44, p. 4). The samples were analyzed for Target Compound List (TCL) volatile organic compounds (VOCs), TCL semivolatile organic compounds (SVOCs) by the Contract Laboratory Program (CLP) Statement of Work (SOW) for Multi-Media, Multi-Concentration Organic Analysis, OLM04.2 and Target Analyte List (TAL) metals with mercury by CLP SOW Multi-Media, Multi-Concentration Inorganic Analysis, ISM01.2 (Ref. 44 p. 5).

Although EPA Emergency Response and Removal Actions took place on the site in 2010 and 2011, the activities performed to date were conducted to stabilize the site and all source materials cited in this report currently remain on-site (Ref. 7, pp. 1-27).

WORKSHEET FOR COMPUTING HRS SITE SCORE

		S	$\mathbf{S^2}$
1.	Ground Water Migration Pathway Score (S_{gw}) (from Table 3-1, line 13)	NS	NS
2a.	Surface Water Overland/Flood Migration Component (from Table 4-1, line 30)	100	10,000
2b.	Ground Water to Surface Water Migration Component (from Table 4-25, line 28)	NS	NS
2c.	Surface Water Migration Pathway Score (S_{sw}) (Enter the larger of lines 2a and 2b as the pathway score)	NS	NS
3.	Soil Exposure Pathway Score (S_s) (from Table 5-1, line 22)	NS	NS
4.	Air Migration Pathway Score (S_a) (from Table 6-1, line 12)	NS	NS
5.	Total of $S_{gw}{}^2 + S_{sw}{}^2 + S_s{}^2 + S_a{}^2$	----	10,000
6.	HRS Site Score: Divide the value on line 5 by 4 and take the square root.		**50.00**

Notes:

S Score
S^2 Score squared
NS Not scored

Tables 3-1, 4-1, 4-25, 5-1, and 6-1 refer to score sheets presented in the HRS Rule (Ref. 1). Table 4-1 is reproduced in the following pages of this HRS documentation record for the convenience of the reader.

DRINKING WATER THREAT - Not Scored (NS)

Factor Categories and Factors			Maximum Value	Value Assigned
	Likelihood of Release			
1.	Observed Release		550	550
2.	Potential to Release by Overland Flow:			
	2a.	Containment	10	NS
	2b.	Runoff	25	NS
	2c.	Distance to Surface Water	25	NS
	2d.	Potential to Release by Overland Flow (lines 2a[2b + 2c])	500	NS
3.	Potential to Release by Flood:			
	3a.	Containment (Flood)	10	NS
	3b.	Flood Frequency	50	NS
	3c.	Potential to Release Flood (lines 3a x 3b)	500	NS
4.	Potential to Release (lines 2d + 3c, subject to a maximum of 500)		500	NS
5.	Likelihood of Release (higher of lines 1 and 4)		550	550
	Waste Characteristics			
6.	Toxicity/Persistence		a	NS
7.	Hazardous Waste Quantity		a	NS
8.	Waste Characteristics (Toxicity/Persistence x Hazardous Waste Quantity, then assign a value from Table 2-7)		100	NS
	Targets			
9.	Nearest Intake		50	NS
10.	Population			
	10a.	Level I Concentrations	b	NS
	10b.	Level II Concentrations	b	NS
	10c.	Potential Contamination	b	NS
	10d.	Population (lines 10a + 10b + 10c)	b	NS
11.	Resources		5	NS
12.	Targets (lines 9 + 10d +11)		b	NS
	Drinking Water Threat Score			
13.	Drinking Water Threat Score [(lines 5 x 8 x 12)/82,500 subject to a maximum of 100]		100	NS

HUMAN FOOD CHAIN THREAT

Factor Categories and Factors		Maximum Value	Value Assigned
	Likelihood of Release		
14.	Likelihood of Release (Same value of line 5)	550	550
	Waste Characteristics		
15.	Toxicity/Persistence/ Bioaccumulation	a	$5x10^8$
16.	Hazardous Waste Quantity	a	100
17.	Waste Characteristics (Toxicity/Persistence/Bioaccumulation x Hazardous Waste Quantity, then assign a value from Table 2-7)	1,000	320
	Targets		
18.	Food Chain Individual	50	45
19.	Population		
	19a. Level I Concentrations	b	0
	19b. Level II Concentrations	b	0.03
	19c. Potential Human Food Chain Contamination	b	0.000303
	19d. Population (lines 19a + 19b + 19c)	b	0.030303
20.	Targets (lines 18 + 19d)	b	45.030303
	Human Food Chain Threat Score		
21.	Human Food Chain Threat Score [(lines 14 x 17 x 20)/82,500 subject to a maximum of 100]	100	96.0646464

ENVIRONMENTAL THREAT

Factor Categories and Factors		Maximum Value	Value Assigned
	Likelihood of Release		
22.	Likelihood of Release (Same value of line 5)	550	550
	Waste Characteristics		
23.	Ecosystem Toxicity/Persistence Bioaccumulation	a	$5x10^8$
24.	Hazardous Waste Quantity	a	100
25.	Waste Characteristics (Ecosystem Tox./Persistence x Bioaccumulation x Hazardous Waste Quantity, then assign a value from Table 2-7)	1,000	320
	Targets		
26.	Sensitive Environments		
	26a. Level I Concentrations	b	0
	26b. Level II Concentrations	b	25
26c.	Potential Contamination		
	26c. Potential Contamination	b	0
26d.	Sensitive Environments (lines 26a + 26b + 26c)	b	25
27.	Targets (value from line 26d)	b	25
	Environmental Threat Score		
28.	Environmental Threat Score [(lines 22 x 25 x 27)/82,500 subject to a maximum of 60]	60	53.33

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORE FOR A WATERSHED

29.	Watershed Score [(Lines 13 + 21+ 28), subject to a maximum of 100]	100	100

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORE

30.	Component Score (Highest score from Line 29 for all watersheds evaluated, subject to a maximum of 100)	100	100

SOURCE DESCRIPTION

2.2 Source Characterization

Source Description: Source 1 – Drums (Flammable and Corrosive)

A total of 797 55-gallon drums containing acids, bases, flammables, oxidizers, hydrogen sulfide, and Resource Conservation and Recovery Act (RCRA) non-hazardous solids and liquids are present on-site at the USOR property (Ref. 7, p. 19). Of these, a total of 357 drums contain flammable liquids, solids, sludge, or gel and 60 drums contain corrosive liquids, solids, sludge or gel (Ref. 10, pp. 1-63). Several of the drums were found open, not appropriately labeled or dated, were in poor condition and appeared to have leaked (Ref. 7, p. 18; Ref. 10, pp. 1-63; Ref. 43, pp. 5, 9, 11, 12). The area of the warehouse (also known as the Container Storage Area) where the drums were found was not authorized to store hazardous waste. The following was also noted during a 15 November 2009 TCEQ inspection: leaking containers; containers stored in an unsafe manner; universal waste not stored in separate double rows of containers from non-hazardous waste; inadequate aisle space; open containers storing waste; and storage of liquid waste (Ref. 8, pp. 8, 110-114, 117, 118, 123-138, 140-143). As part of the EPA ER activities conducted in July 2010, EPA contractors performed hazardous categorization of the drums and staged the drums within the warehouse according to their waste streams. Since adequate containment of the drums was not evident prior to July 2010, secondary containment areas were built to ensure all containers were stable and not staged in an unsafe manner (Ref. 7, p. 19).

Source Type

The waste contents are in drums (Ref. 7, pp. 18-19) and as such, the source type for Source 1 is “Drum” (Ref. 1, Table 2-5).

Source Location

All of the drums are located within the Container Storage Area of the centralized USOR property at 400 N. Richey (Ref. 7, p. 18; Ref. 27, p. 7; Ref. 43, pp. 5, 9, 11, 12). The location of the Container Storage Area is depicted on Attachment A, Figure A-2A.

Source Containment

Release To Surface Water

Contents of the drums were previously exposed to precipitation and potentially surface water (through runoff and flooding) and were in direct contact with floodwater (Ref. 6, pp. 68, 97, 100, 101, 102, 120, 187, 208, 211). Before the EPA response activities in July 2010 to secure and properly stage the drums, several of the drums were found opened and in varying states of disrepair (Ref 7, p. 18; Ref. 10, pp. 1-63; Ref. 43, pp. 5, 9, 11, 12). During inspections of the USOR property conducted in November and December 2009 by EPA, TCEQ, and/or HCPHES, drums located within the Container Storage Area were observed to be leaking, badly deteriorated, and lacking secondary containment (Ref. 5, pp. 18, 75, 288-289; Ref. 8, pp. 8, 110-119, 123-138, 140-142). Since the EPA response activities in 2010 have placed the drums within secondary containment, a containment value of 9 was selected for Source 1 based on the current containment conditions, but the site is currently abandoned, and there is no maintenance of the containment area (Ref. 1, Table 4-2).

Containment Value: 9

2.4.1 Hazardous Substances

As part of supplemental sampling of the USOR site from 01 through 04 March 2011, the EPA Region 6 START-3 contractor collected waste sample from two of the drums (D0745 and D0761) (Ref. 28, p. 73; Ref. 44, p. 4). These drums were located within the warehouse of the USOR property at 400 N. Richey Street (Ref. 5, pp. 13, 62, 69, 75). Drums D0745 and D0761 were sampled based on their hazardous categorization results and were identified by EPA START-3 as a Corrosive Acid with a pH less than 3 and as a Flammable Liquid (Ref. 10, pp. 60, 61). The samples were analyzed for VOCs and SVOCs by CLP OLM04.2 and for TAL metals and mercury by CLP ISM01.2 by the EPA Region 6 Environmental Services Branch Laboratory (Ref. 24, pp. 171-182,326; Ref. 28, p. 73; Ref. 29, p. 19; Ref. 44, pp. 4, 5).

Analytical evidence of the contamination in waste source samples associated with the two drums located on the USOR site is summarized below.

Hazardous Substance	Evidence			References
	Sample ID	Concentration (mg/L)	Reporting Limit[1] (mg/L)	
EPA Supplemental Sampling Activities – March 2011				
Acetone	D0745-00-81	0.0892	0.010	Ref. 24, pp. 171, 326; Ref. 28, p. 73
2-Butanone	D0745-00-81	0.173 L	0.050	Ref. 24, pp. 171, 326,;Ref. 28, p. 73
Benzoic Acid	D0745-00-81	0.948 J	0.10	Ref. 24, pp. 173, 326; Ref. 28, p. 73
Cobalt	D0745-00-81	7.83	2	Ref. 24, pp. 176, 326; Ref. 28, p. 73
Manganese	D0745-00-81	852	0.5	Ref. 24, pp. 176, 326; Ref. 28, p. 73
Nickel	D0745-00-81	5,400	2	Ref. 24, pp. 176, 326; Ref. 28, p. 73
Zinc	D0745-00-81	14,700	2	Ref. 24, pp. 176, 326; Ref. 28, p. 73
Cyclohexane	D0761-00-81	202	20	Ref. 24, pp. 177, 326; Ref. 28, p. 73
Benzene	D0761-00-81	37.9	20	Ref. 24, pp. 177, 326; Ref. 28, p. 73
Methylcyclohexane	D0761-00-81	844	20	Ref. 24, pp. 177, 326; Ref. 28, p. 73
Toluene	D0761-00-81	618	20	Ref. 24, pp. 178, 326; Ref. 28, p. 73
Ethylhexylbenzene	D0761-00-81	458	20	Ref. 24, pp. 178, 326; Ref. 28, p. 73
meta/para-Xylene	D0761-00-81	1,480	40	Ref. 24, pp. 178, 326; Ref. 28, p. 73
ortho-Xylene	D0761-00-81	703	20	Ref. 24, pp. 178, 326; Ref. 28, p. 73
Isopropylbenzene	D0761-00-81	163	20	Ref. 24, pp. 178, 326; Ref. 28, p. 73
1,1’-Biphenyl	D0761-00-81	208	97.1	Ref. 24, pp. 179, 326; Ref. 28, p. 73
2-Methylnaphthalene	D0761-00-81	715	38.8	Ref. 24, pp. 180, 326; Ref. 28, p. 73
Naphthalene	D0761-00-81	372	38.8	Ref. 24, pp. 180, 326; Ref. 28, p. 73

Hazardous Substance	Evidence			References
	Sample ID	Concentration (mg/L)	Reporting Limit[1] (mg/L)	
Phenanthrene	D0761-00-81	101	38.8	Ref. 24, pp. 181, 326; Ref. 28, p. 73
Pyrene	D0761-00-81	67.6	38.8	Ref. 24, pp. 181, 326; Ref. 28, p. 73

Notes:
(mg/L) milligrams per liter = 1,000 micrograms per liter (ug/L)
J Identification of analyte is acceptable; the reported value is an estimate Ref. 24, p. 328.
L Identification of analyte is acceptable; reported value may be biased low, Ref. 24, p. 328
H Identification of analyte is acceptable; reported value may be biased high, Ref. 24, p.328.
1 The Reporting Limit (RL) terminology used by the EPA Region 6 Laboratory is adjusted for sample aliquot, sample volume, and dilutions for the analysis and meets the definition of Sample Quantitation Limit (SQL) as defined by the HRS (Ref. 1, Section 1.1; Ref. 24, p. 4; Ref. 26).

2.4.2 Hazardous Waste Quantity

2.4.2.1 Source Hazardous Waste Quantity

2.4.2.1.1 Tier A: Hazardous Constituent Quantity- Not Evaluated (NE)

The information available is not sufficient to adequately determine a hazardous constituent quantity with reasonable confidence for Source 1 (Ref. 1, Section 2.4.2.1.1). Scoring proceeds to the evaluation of Tier B, hazardous wastestream quantity (Ref. 1, Section 2.4.2.1.2).

2.4.2.1.2 Tier B: Hazardous Wastestream Quantity

As part of the EPA emergency response activities, a total of 357 drums containing flammable liquids, solids, sludge, or gel and 60 drums containing corrosive liquids, solids, sludge or gel were found within the Container Storage Area at 400 N. Richey (Ref. 7, p. 19; Ref. 8, pp. 8, 110-114, 117-119, 123-142; Ref. 10, pp. 1-63). As presented below, the volume of each drum was estimated during container inventory and HAZCAT activities conducted during the July 2010 EPA Emergency Response (Ref. 7, p. 19, Ref. 10, pp. 1-86). During EPA response activities in July 2010, drummed waste was separated into waste streams that contained similar chemical traits using hazardous characterization (HAZCAT) techniques (Ref. 7, p. 19). The remaining 440 drums stored at the facility were not included in the hazardous wastestream quantity calculation since HAZCAT results did not identify their contents as RCRA hazardous waste exhibiting the characteristics indentified under Section 3001 of RCRA as amended (Ref. 1, Section 2.4.2.1.2; Ref. 10, pp. 1-86). The following table presents a summary of the hazardous waste streams identified and their quantities (Ref. 10, pp. 1-86).

Waste Stream	Matrix	Volume in Gallons (approximate)	References
Combustible, Corrosive Acid	Liquid	94	Ref. 10, pp. 29, 48
Corrosive Acid	Liquid	1300	Ref. 10, pp. 5,7,10,11, 17,18,28,29,32-34,36,42,47,48,49,59,60,61
Corrosive Base	Liquid	400	Ref. 10, pp. 9, 15, 17

Waste Stream	Matrix	Volume in Gallons (approximate)	References
Flammable	Liquid	12000	Ref. 10, pp. 1-3, 5-11, 13-16, 18-62
Flammable, Corrosive Acid	Liquid	170	Ref. 10, pp. 33, 34
Flammable, Corrosive Base	Liquid	41	Ref. 10, pp. 23, 30, 31, 36, 62
Subtotal Volume of Liquids			**14,005**
Flammable	Sludge	690	Ref. 10, pp. 6, 9, 20, 22, 24, 27, 30, 35,40, 41, 42, 52,53, 56,
Subtotal Volume of Sludge			**690**
Corrosive Acid	Gel	55	Ref. 10, p. 2
Corrosive Base	Gel	44	Ref. 10, p. 31
Flammable	Gel	670	Ref. 10, pp. 2, 10, 12, 21,22, 23, 51,52,
Subtotal Volume of Gel			**769**
Corrosive Acid	Liquid/Solid	50	Ref. 10, p. 7
Flammable	Liquid/Solid	50	Ref. 10, pp. 7, 12, 45,
Subtotal Volume of Liquid/Solids			**100**
Corrosive Acid	Solid	240	Ref. 10, pp. 7,12, 47, 49,59
Flammable	Solid	1100	Ref. 10, pp. 3, 5, 6, 11- 13, 20, 23, 24, 26- 28, 30, 31, 34, 41, 42, 44-46, 48, 50, 54 ,58, 61
Flammable, Corrosive Base	Solid	44	Ref. 10, p. 31
Subtotal Volume of Solids			**1,384**
Total Volume of Hazardous Waste Stream Drums			**16,948**

The total volume of the drums (liquids and solids) was calculated based on the container size (55 gallons) and the content level of each drum determined during inventory (Ref. 10, pp. 1-86). The total volume of the drums containing hazardous substances equals 16,948 gallons. The Tier B equation for assigning a value for Hazardous Waste stream Quantity (W) is W (in pounds)/5,000 (Ref. 1, Table 2-5).

Volume of source (gallons): 16,948

1 gallon = 10 pounds (Ref. 1, Table 2-5)

16,948 gallons = 169,480 pounds (lbs)

Hazardous Waste stream Quantity = 169,480 lbs/5,000

Hazardous Waste stream Quantity = 33.896

2.4.2.1.3 Tier C: Volume - Not Evaluated (NE)

Tier B, the hazardous waste stream quantity of the source has been estimated with reasonable confidence, therefore the value assigned for Tier C is not evaluated (Ref. 1, Section 2.4.2.1.4).

Volume Assigned Value = Not Evaluated

2.4.2.1.4 Tier D: Area - Not Evaluated (NE)

Tier B, the hazardous waste stream quantity of the source has been estimated with reasonable confidence, therefore the value assigned for Tier D is not evaluated (Ref. 1, Section 2.4.2.1.4).

Area Assigned Value = Not Evaluated

2.4.2.1.5 Source Hazardous Waste Quantity Value

Per the HRS, the highest of the values assigned to the source for hazardous constituent quantity (Tier A), hazardous wastestream quantity (Tier B), Volume (Tier C), and Area (Tier D) should be assigned as the source hazardous waste quantity value (Ref. 1, Section 2.4.2.1.5).

Tier Evaluated	Source 1 Values
A	Not Evaluated
B	33.896
C	Not Evaluated
D	Not Evaluated

Source Hazardous Waste Quantity Value: 33.896

SOURCE DESCRIPTION

2.2 Source Characterization

Source Description: Source 2 – Bioreactors

The bioreactors (also known as aeration basin) are two contiguous rectangular, steel-reinforced, concrete open-topped tanks with capacities of 330,000 gallons each. They are permitted through the State of Texas as non-hazardous wastewater treatment tanks located on the northwest side of the 400 N. Richey Street property. These bioreactors are collectively known as the aeration basin because the original purpose of the units was to treat organics in wastewater with bacteria kept alive through an aerating process with oxygen (Ref. 8, p. 2). In a letter dated 14 April 2008, USOR advised the TCEQ that the bioreactors were no longer being used as aeration basins, but were being used for waste equalization. On 14 March 2009, the bioreactors suffered a structural failure and released approximately 200,000 gallons of wastewater to the surrounding soil when a section of concrete separated from the top of the west wall (Ref. 8, pp. 2, 11, 87, 150). Additionally, the west and east walls bowed outward apparently due to pressure exerted against the walls by wastewater. Additionally significant cracks, primarily in the long (east and west) walls near the corners were discovered (Ref. 8, p. 277; Ref. 43, pp. 3, 4). USOR excavated the contaminated soil, stabilized the basin, and ceased using the bioreactors as wastewater treatment units. The bioreactors, therefore, became waste storage units on 14 March 2009 (Ref. 8, p. 2). Samples collected by USOR from the bioreactors on 27 September 2009 were found to be hazardous for benzene per a letter dated 30 September 2009 from USOR to the United States Coast Guard (Ref. 8, pp. 16, 251-259).

Source Type

The waste contents are in concrete open-topped tanks and, as such, the source type for Source 2 is “Surface Impoundment” (Ref. 1, Table 2-5).

Source Location

The bioreactors are located on the north end of the 400 N. Richey Street property and are shown on Attachment A, Figure A-2A.

Source Containment

Release To Surface Water

The contents of the bioreactors are exposed to precipitation and surface water (through flooding) (Ref. 6, pp. 92, 94, 100, 106, 170, 178, 199, 232-234). Evidence of hazardous substance migration from Source 2 is documented below.

- In December 2007, TCEQ investigators found that an unauthorized discharge of wastewater onto the ground was occurring from cracks in the west wall of the aeration basin (also known as bioreactors) (Ref. 5, pp. 17, 338).
- A release of hazardous waste occurred from the west side of the bioreactors in March 2009. Several hundred gallons of waste spilled to the ground and ran north about 350 feet towards

Vince Bayou (Ref. 5, pp. 17, 504; Ref. 9, pp. 3-4).

- On 5 November 2010, TCEQ observed leaking from several small holes in the north wall of the bioreactor. The leaking liquid was going onto the ground (Ref. 5, p. 131).

A containment value of 10 was selected for Source 2 based on the evidence cited above of hazardous substance migration from the bioreactors and the lack of spill prevention containment measures at the site (Ref. 1, Table 4-2).

Containment Value: 10

2.4.1 Hazardous Substances

On 17 December 2007, the TCEQ Region 12 Waste Program collected soil samples adjacent to and downgradient of the bioreactors following discovery of an unauthorized discharge from cracks in the west wall of the bioreactors. All six of the soil samples collected contained concentrations of arsenic, lead, and/or mercury exceeding TCEQ TRRP Tier 1 residential PCLs (Ref. 5, pp. 17, 338).

As part of the supplemental sampling conducted at the USOR site on 01 through 04 March 2011, EPA START-3 collected a waste sample from the bioreactor (WW-02) (Ref. 28, p. 73; Ref. 44, p. 4). The sample was analyzed for VOCs and SVOCs by CLP OLM04.2 and for TAL metals and mercury by CLP ISM05.3 by the EPA Region 6 Environmental Services Branch Laboratory (Ref. 24, pp. 165-170, 325).

Analytical evidence of the contamination in waste source sample associated with the bioreactors (classified as source type "Tanks and Containers Other Than Drums") located on the USOR site is summarized in the following table.

Hazardous Substance	Evidence				References
	Sample ID	Concentration	RL[1]	Units	
EPA Supplemental Sampling Activities – March 2011					
Acetone	WW-02-00-11-20110303	0.774	0.10	mg/L	Ref. 24, pp. 165, 325 ; Ref. 28, p. 73
Methylene chloride	WW-02-00-11-20110303	0.0260	0.002	mg/L	Ref. 24, pp. 165, 325 ; Ref. 28, p. 73
Methyl acetate	WW-02-00-11-20110303	0.0159	0.002	mg/L	Ref. 24, pp. 165, 325 ; Ref. 28, p. 73
Methy tert-butyl ether	WW-02-00-11-20110303	0.0074	0.002	mg/L	Ref. 24, pp. 165, 325 ; Ref. 28, p. 73
2-Butanone	WW-02-00-11-20110303	0.519	0.05	mg/L	Ref. 24, pp. 165, 325 ; Ref. 28, p. 73
1,2-Dichloroethane	WW-02-00-11-20110303	0.0038	0.002	mg/L	Ref. 24, pp. 165, 325 ; Ref. 28, p. 73
Benzene	WW-02-00-11-20110303	0.0316	0.002	mg/L	Ref. 24, pp. 165, 325 ; Ref. 28, p. 73
Trichloroethene	WW-02-00-11-20110303	0.0033	0.002	mg/L	Ref. 24, pp. 165, 325 ; Ref. 28, p. 73
4-Methyl-2-pentanone	WW-02-00-11-20110303	0.0112	0.005	mg/L	Ref. 24, pp. 166, 325 ; Ref. 28, p. 73
Toluene	WW-02-00-11-20110303	0.0104	0.002	mg/L	Ref. 24, pp. 166, 325 ; Ref. 28, p. 73
2-Hexanone	WW-02-00-11-20110303	0.0094	0.005	mg/L	Ref. 24, pp. 166, 325 ; Ref. 28, p. 73
Ethylbenzene	WW-02-00-11-20110303	0.0035	0.002	mg/L	Ref. 24, pp. 166, 325 ; Ref. 28, p. 73
meta-/para-Xylene	WW-02-00-11-20110303	0.0138	0.004	mg/L	Ref. 24, pp. 166, 325 ; Ref. 28, p. 73
ortho-Xylene	WW-02-00-11-20110303	0.0056	0.002	mg/L	Ref. 24, pp. 166, 325 ; Ref. 28, p. 73

Hazardous Substance	Evidence				References
	Sample ID	Concentration	RL[1]	Units	
Acetophenone	WW-02-00-11-20110303	0.120	0.10	mg/L	Ref. 24, pp. 167, 325 ; Ref. 28, p. 73
Benzoic acid	WW-02-00-11-20110303	4.71 J	2.0	mg/L	Ref. 24, pp. 167, 325 ; Ref. 28, p. 73
Bis(2-ethylhexyl)phthalate	WW-02-00-11-20110303	0.506	0.10	mg/L	Ref. 24, pp. 167, 325 ; Ref. 28, p. 73
Di-n-butyl phthalate	WW-02-00-11-20110303	0.497	0.10	mg/L	Ref. 24, pp. 168, 325 ; Ref. 28, p. 73
2-Methylnaphthalene	WW-02-00-11-20110303	0.0618	0.04	mg/L	Ref. 24, pp. 168, 325 ; Ref. 28, p. 73
3&/or4-Methylphenol	WW-02-00-11-20110303	0.338	0.10	mg/L	Ref. 24, pp. 168, 325 ; Ref. 28, p. 73
Naphthalene	WW-02-00-11-20110303	0.226	0.04	mg/L	Ref. 24, pp. 168, 325 ; Ref. 28, p. 73
Phanathrene	WW-02-00-11-20110303	0.187	0.04	mg/L	Ref. 24, pp. 169, 325 ; Ref. 28, p. 73
Phenol	WW-02-00-11-20110303	5.61	1.0	mg/L	Ref. 24, pp. 169, 325 ; Ref. 28, p. 73
Barium	WW-02-00-11-20110303	0.110	0.10	mg/L	Ref. 24, pp. 170, 325 ; Ref. 28, p. 73
Manganese	WW-02-00-11-20110303	0.49	0.050	mg/L	Ref. 24, pp. 170, 325 ; Ref. 28, p. 73
Nickel	WW-02-00-11-20110303	0.317	0.20	mg/L	Ref. 24, pp. 170, 325 ; Ref. 28, p. 73
Zinc	WW-02-00-11-20110303	1.9	0.20	mg/L	Ref. 24, pp. 170, 325 ; Ref. 28, p. 73

Notes:
(mg/L) milligrams per liter = 1,000 micrograms per liter (ug/L)
J Identification of the analyte is acceptable; the reported value is an estimate (Ref. 24, p. 328).
1 The Reporting Limit (RL) terminology used by the EPA Region 6 Laboratory is detection limits which have been adjusted for sample aliquot, sample volume, and dilutions for the analysis and meet the HRS definition of SQL (Ref. 1, Section 1.1; Ref. 24, p. 4; Ref. 26).

2.4.2 Hazardous Waste Quantity

2.4.2.1 Source Hazardous Waste Quantity

2.4.2.1.1 Tier A: Hazardous Constituent Quantity - Not Evaluated (NE)

The information available is not sufficient to adequately determine a hazardous constituent quantity with reasonable confidence for Source 2 (Ref. 1, Section 2.4.2.1.1). Scoring proceeds to the evaluation of Tier B, hazardous wastestream quantity (Ref. 1, Section 2.4.2.1.2).

2.4.2.1.2 Tier B: Hazardous Wastestream Quantity - Not Evaluated (NE)

The information available is not sufficient to adequately determine a hazardous wastestream quantity with reasonable confidence for Source 2 (Ref. 1, Section 2.4.2.1.2). Scoring proceeds to the evaluation of Tier C, volume (Ref. 1, Section 2.4.2.1.3).

2.4.2.1.3 Tier C: Volume

The quantity volume of the bioreactors was determined by measurements obtained by using GIS software, and the assumed maximum permissible fluid depth. GIS software contains recent aerial photography of the site, which allows the user to trace an area and determine length and width measurements of the bioreactor. Using this methodology, the bioreactors were determined to measure 120 feet x 60 feet with a fluid depth of 11 feet (Attachment A, Figure A-2A; Ref. 8, p., 279; Ref. 25).

The Tier C equation for assigning a value for volumes of a source type “Surface Impoundment” is V/2.5 (Ref. 1, Table 2-5).

120 x 60 x 11 = 79,200 cubic feet

79,200 cubic feet / 27 cubic feet per 1 cubic yard = 2,933.333 cubic yards

Volume of source (cubic yards): 2,933.333

Volume Assigned Value = 2,933.333/2.5

Volume Assigned Value = 1,173.333

2.4.2.1.4 <u>Tier D: Area - Not Evaluated (NE)</u>

Tier C, volume, has already been determined; therefore, the value assigned for Tier D is not evaluated (Ref. 1, Section 2.4.2.1.4).

Area Assigned Value = 0

2.4.2.1.5 <u>Source Hazardous Waste Quantity Value</u>

Per the HRS, the highest of the values assigned to the source for hazardous constituent quantity (Tier A), hazardous wastestream quantity (Tier B), volume (Tier C), and area (Tier D) should be assigned as the source hazardous waste quantity value (Ref. 1, Section 2.4.2.1.5).

Tier Evaluated	Source 2 Values
A	Not Evaluated
B	Not Evaluated
C	1,173.333
D	0

Source Hazardous Waste Quantity Value: 1,173.333

SOURCE DESCRIPTION

2.2 Source Characterization

Source Description: Source 3 - Truck Bays used as Sumps

The truck bay sumps (also known as Bays 34 through 36) on the USOR property contain significant volumes of oily waste and sludge and have several visibly leaking weep holes (Ref. 5, pp. 14, 380, 422: Ref 6, pp. 102, 214). On 1 June 2006, a TCEQ investigator also observed oily waste migrating outside the secondary containment to the concrete truck unloading/staging area (the truck bay sumps) (Ref. 5, pp. 16, 495, 496).

Source Type

The waste contents are in concrete open-top structures, as such, the source type for Source 3 is "Surface Impoundment" (Ref. 1, Table 2-5).

Source Location

The truck bay sumps are located on the north side of the 400 N. Richey Street property and are shown on Attachment A, Figure A-2A.

Source Containment

Release To Surface Water

The contents of the truck bay sumps are exposed to precipitation and surface water (through flooding) (Ref. 6, pp. 79, 80, 100, 102, 106, 141, 151, 152, 199, 214, 235). During one large rainfall event in July 2010, TCEQ found the truck bays were overflowing oily liquids into the parking lot area, which was then discharging down the property's front driveway and into Vince Bayou (Ref. 5, pp. 19, 88, 89). In November 2010, the available freeboard in the truck bay sumps (also known as Sumps 34 through 36) had become compromised due to heavy rains and the contents were overflowing to the parking lot (Ref. 6, pp. 105, 226-231; Ref. 7, p. 22). On 1 June 2006, a TCEQ investigator also observed oily waste migrating outside the secondary containment to the concrete truck unloading/staging area (Ref. 5, pp. 16, 495, 496).

A containment value of 10 was selected for Source 3 based on the evidence of hazardous substance migration from the truck bay sumps and the lack of spill prevention containment measures at the site (Ref. 1, Table 4-2).

Containment Value: 10

2.4.1 Hazardous Substances

On 15 and 16 November 2010, as part of EPA's emergency response activities, EPA START-3 collected one composite sample that was collected from three truck bays which were used as sumps (also known as sumps 34, 35 and 36) (WP03) (Ref. 28, pp. 18, 22). The sample was hand delivered to

Accutest Laboratories located in Houston, Texas. The sample was analyzed for Toxicity Characteristic Leaching Procedure (TCLP) VOCs by SW846 1311/8260B, TCLP SVOCs by SW846 1311/8270C, and Resource Conservation and Recovery Act (RCRA) list total and TCLP metals with mercury by SW846 1311/6010B/7470A (Ref. 45, p. 24).

Analytical evidence of the contamination in waste source samples associated with the Truck Bay Sumps (classified as source type "Surface Impoundments") located on the USOR site is summarized in the following table.

Hazardous Substance	Evidence				References
	Sample ID	Concentration	MQL[1]	Units	
Benzene	WP03-71-101116	0.273[3]	0.25	mg/L	Ref. 45, pp. 18, 24; Ref.49, pp. 1,8
Methyl ethyl ketone	WP03-71-101116	0.320 JQ[3]	0.50	mg/L	Ref. 45, pp. 18, 24; Ref.49, pp. 1,8
2-Methylphenol	WP03-71-101116	0.0353 JQ[3]	0.050	mg/L	Ref. 45, pp. 19, 24; Ref.49, pp. 9, 16
3&4-Methylphenol	WP03-71-101116	0.0797[3]	0.050	mg/L	Ref. 45, pp. 19, 24; Ref.49, pp. 9, 16
Barium	WP03-71-101116	0.21 JQK[3]	5.0	mg/L	Ref. 45, pp. 20, 24; Ref.49, pp. 17, 27
Chromium	WP03-71-101116	0.021 JQK[3]	0.050	mg/L	Ref. 45, pp. 20, 24; Ref.49, pp. 17, 27
Arsenic	WP03-71-101116	5.5	0.68	mg/kg	Ref. 45, pp. 22, 24; Ref.49, pp. 17, 24
Barium	WP03-71-101116	518	14	mg/kg	Ref. 45, pp. 22, 24; Ref.49, pp. 17, 24
Cadmium	WP03-71-101116	0.50	0.34	mg/kg	Ref. 45, pp. 22, 24; Ref.49, pp. 17, 24
Chromium	WP03-71-101116	40.9	0.68	mg/kg	Ref. 45, pp. 22, 24; Ref.49, pp. 17, 24
Lead	WP03-71-101116	45.3	0.68	mg/kg	Ref. 45, pp. 22, 24; Ref.49, pp. 17, 24
Mercury	WP03-71-101116	9.5	0.96	mg/kg	Ref. 45, pp. 22, 24; Ref.49, pp. 17, 24
Selenium	WP03-71-101116	0.96	0.68	mg/kg	Ref. 45, pp. 22, 24; Ref.49, pp. 17, 24
Silver	WP03-71-101116	0.60JQ	0.68	mg/kg	Ref. 45, pp. 22, 24; Ref.49, pp. 17, 24

Notes:
(mg/L) milligrams per liter = 1,000 micrograms per liter (ug/L)
(mg/kg) milligrams per kilogram = 1,000 micrograms per kilogram (ug/kg)
J The value is an estimated quantity (Ref. 49, p. 2).
Q The reported concentration is less than the sample quantitation limit for the specified analyte in the sample (Ref. 49, p. 2).
K Unknown bias (Ref. 49, p. 2).
1 The Method Quantitation Limit (MQL) terminology used by Accutest Laboratory are detection limits which have been adjusted for sample aliquot, sample volume, and dilutions for the analysis and meet the HRS definition of SQL (Ref. 1, Section 1.1; Ref. 24, p. 4; Ref. 26).
2 All laboratory data collected during EPA emergency response activities were validated by an EPA START-3 chemist in accordance with *EPA Quality Assurance/Quality Control Guidance for Removal Activities, OSWER Directive 9360.4-01* for definitive data use objectives and were found to be usable for the intended purpose. Data for target analytes meet the definitive data quality objective (Ref 49, pp. 5, 13, 21, 31).
3 These concentrations reported from the TCLP Leachate of the sample.

2.4.2 Hazardous Waste Quantity

2.4.2.1 Source Hazardous Waste Quantity

2.4.2.1.1 Tier A: Hazardous Constituent Quantity - Not Evaluated (NE)

The information available is not sufficient to determine with reasonable confidence a hazardous constituent quantity for Source 3 – Secondary Containment and Truck Bay Sumps (Ref. 1, Section 2.4.2.1.1). Scoring proceeds to the evaluation of Tier B, hazardous wastestream quantity (Ref. 1, Section 2.4.2.1.2).

2.4.2.1.2 Tier B: Hazardous Wastestream Quantity - Not Evaluated (NE)

The information available is not sufficient to determine a hazardous wastestream quantity with reasonable confidence for Source 3 (Ref. 1, Section 2.4.2.1.2). Scoring proceeds to the evaluation of Tier C, volume (Ref. 1, Section 2.4.2.1.3).

2.4.2.1.3 Tier C: Volume

The volume of the secondary containment structures and truck bay sumps was determined by measurements obtained by using GIS software. The depth was determined on site by field personnel. The truck bay sumps measure 75 feet x 22 feet x 2 feet (Attachment A, Figure A-2A; Ref. 46). The Tier C equation for assigning a value for volumes of a source type "Surface Impoundments" is V/2.5 (Ref. 1, Table 2-5).

Truck Bay Sumps – 75 x 22 x 2 = 3,300 cubic feet
Total = 3,300 cubic feet

3,300 cubic feet / 27 cubic feet per 1 cubic yard = 122.222 cubic yards

Volume of source (cubic yards): 122.222

Volume Assigned Value = 122.222/2.5

Volume Assigned Value = 48.889

2.4.2.1.4 Tier D: Area - Not Evaluated (NE)

Tier C, volume, has been determined; therefore, the value assigned for Tier D is not evaluated (Ref. 1, Section 2.4.2.1.4).

Area Assigned Value = 0

2.4.2.1.5 Source Hazardous Waste Quantity Value

Per the HRS, the highest of the values assigned to the source for hazardous constituent quantity (Tier A), hazardous wastestream quantity (Tier B), volume (Tier C), and area (Tier D) should be assigned as the source hazardous waste quantity value (Ref. 1, Section 2.4.2.1.5).

Tier Evaluated	Source 3 Values
A	Not Evaluated
B	Not Evaluated
C	48.889
D	0

Source Hazardous Waste Quantity Value: 48.889

SOURCE DESCRIPTION

2.2 Source Characterization

<u>Source Description: Source 4 – MCC Surface Impoundments</u>

The surface impoundments at the MCC property include the gravity thickener, digesters, clarifiers, chorine contact tank, and the headworks (also referred to as the oil water separator). These structures are shown on Attachment A, Figure A-2B.

The property at 200 N. Richey Street once belonged to the City of Pasadena Vince Bayou WWTP. The old plant had been designed and used to treat domestic wastewater. Structures of the old WWTP have been converted by MCC Recycling, which is owned by USOR, into oily and organic wastewater treatment and storage units (Ref. 12, p. 5). These structures were not designed to store waste, and TCEQ required USOR to determine whether the structures were structurally sound and capable of functioning for the purpose of wastewater treatment. This testing was never completed (Ref. 12, p. 6). During TCEQ investigations conducted in May and June of 2009, it was noted that the structures at 200 N. Richey Street located on the west side of Vince Bayou were in use except for the headworks (also known as oil water separator). At the east plant, the old clarifier, oxygen activated sludge tank, oxygen digesters, and final clarifiers were being used as wastewater storage vessels (Ref. 12, p. 7).

On 11 March 2011, EPA START contractors collected measurements of the various surface impoundments located at the 200 N. Richey Street property. The diameter, depth, and liquid levels were measured for the gravity thickener, aerobic digester, aeration basin (final clarifier), primary clarifier, clarifiers #1 and #2, chlorine contact tank, oxygen activated sludge tank, oxygen digesters #1 and #2, lift stations 1 and 3, and the headworks (also known as oil water separator) (Ref. 13, pp. 1-4).

The MCC surface impoundments are aggregated together because they are similar source types (open-top concrete structures), all received wastewater from the USOR property, have similar containment, affect same targets, contain similar substances (as will be shown below) and are in the same watershed.

<u>Source Type</u>

The waste contents are in various surface impoundments and, as such, the source type for Source 4 is "Surface Impoundments" (Ref. 1, Table 2-5).

<u>Source Location</u>

The MCC surface impoundments are located throughout the 200 N. Richey Street property and are shown on Attachment A, Figure A-2B.

<u>Source Containment</u>

Release To Surface Water

The contents of each reservoir are exposed to precipitation and surface water (through flooding). Agencies including EPA, TCEQ, and HCPHES have documented multiple spills from the wastewater treatment property that migrated into Vince Bayou (Ref. 5, pp. 19-20, 62-63, 78, 90-92, 130-131; Ref. 6, pp. 15-16, 18-19, 74, 81, 83-84, 86-87, 89-90, 284, 287, 295-296, 649-650, 664-665; Ref. 8, p. 8; Ref. 18, pp. 3-6, 11). EPA and TCEQ documented that, during several spills in 2009, there was a lack of spill prevention containment measures at the site (Ref. 6, p. 14, 326). Evidence of hazardous substance migration from Source 4 is documented below.

- In June, 2008 personnel with the TCEQ and HCPES responded to a release of wastewater from the west side lift station that was flowing onto the ground and then entering Vince Bayou (Ref. 6, pp. 15, 649, 650).
- MCC failed to prevent unpermitted discharges on 15 May, 18 May, 20 May, 26 May, 29 May, and 8 June, 2009 into Vince Bayou. The discharge that was observed on 18 May 2009 was from the chlorine contact chamber. The other discharges were due to spills (Ref. 6, p. 325).
- In January 2010, wastewater was discharging from the property from the old chlorine contact tank flow measurement channel to Vince Bayou from two unpermitted outfalls (Ref. 6, p. 18, 664-665).
- In July 2010, EPA noted an overflow of oily waste at the east plant lift station (also known as Lift Station #1), and leaking of pipes onto vegetation and soil (Ref. 6, pp. 18, 87, 89-90).
- In July 2010, liquid from the chlorine contact chamber was surfacing from cracks in a concrete road near the northwest corner of the chlorine contact chamber. The liquid was running across the concrete road, onto the ground, and into Vince Bayou near the northwest corner of the east plant. The release was stopped by pumping liquid from the chlorine contact chamber into frac-tanks (Ref. 6, pp. 19, 74, 81, 83-84, 86, 284, 287).

A containment value of 10 was selected for Source 4 based on the evidence of hazardous substance migration from the source surface impoundments and the lack of spill prevention containment measures at the site (Ref. 1, Table 4-2).

Containment Value: 10

2.4.1 Hazardous Substances

On 12 July 2010 as part of EPA's emergency response activities, EPA START-3 collected the following eight samples from the surface impoundments located at 200 N. Richey Street: sample MCC-WW03 was collected from Oxygen Digester #2; sample MCC-WW04 was collected from Oxygen Digester #1; sample MCC-WW05 was collected from clarifier #2; samples MCC-WW06 and MCC-WW07 were collected from clarifier #1; sample MCC-WW08 was collected from the Primary Clarifier; sample MCC-WW09 was collected from the Final Clarifier; and MCC-WW10 was collected from the headworks (also known as oil water separator) (Ref. 27, pp. 39-41). The samples were hand delivered to Accutest Laboratories located in Houston, Texas. The samples were analyzed for VOCs by SW846 8260B, SVOCs by SW846 8270C, and TAL metals with mercury by SW846 6010B/7470A (Ref. 22, pp. 4, 5).

As part of the supplemental sampling conducted at the USOR site on 01 through 04 March 2011, EPA START-3 collected waste samples from two surface impoundments located on-site. One sample was collected from the gravity thickener (SL-01), and one sample was collected from the chlorine contact tank (WW-01). The samples were analyzed for VOCs and SVOCs by CLP OLM04.2 and for TAL metals and mercury by CLP ISM05.3 by the EPA Region 6 Environmental Services Branch Laboratory (Ref. 24, pp. 123-128, 159-164,325.

Analytical evidence of the contamination in waste source samples associated with the MCC surface impoundments (classified as source type “Tanks and Containers Other Than Drums”) located on the USOR site at the 200 N. Richey property is summarized in the following table.

Hazardous Substance	Evidence				References
	Sample ID	Concentration	RL/MQL[1]	Units	
EPA Emergency Response Activities – July 2010[2]					
Acetone	MCC-WW03-11-100712	0.777	0.050	mg/L	Ref. 22, pp. 7, 56; Ref. 23, pp. 1,6
Carbon disulfide	MCC-WW03-11-100712	0.0176	0.0020	mg/L	Ref. 22, pp. 7, 56; Ref. 23, pp. 1,6
Ethylbenzene	MCC-WW03-11-100712	0.00098 JQ	0.0020	mg/L	Ref. 22, pp. 7, 56; Ref. 23, pp. 1,6
4-Methyl-2-pentanone	MCC-WW03-11-100712	0.0509 JK	0.010	mg/L	Ref. 22, pp. 7, 56; Ref. 23, pp. 1,6
Methyl ethyl ketone	MCC-WW03-11-100712	0.186 JK	0.010	mg/L	Ref. 22, pp. 7, 56; Ref. 23, pp. 1,6
Toluene	MCC-WW03-11-100712	0.0042	0.0020	mg/L	Ref. 22, pp. 7, 56; Ref. 23, pp. 1,6
Xylene (total)	MCC-WW03-11-100712	0.0023 JQ	0.0060	mg/L	Ref. 22, pp. 8, 56; Ref. 23, pp. 1,7
Benzoic acid	MCC-WW03-11-100712	0.586	0.058	mg/L	Ref. 22, pp. 9, 56; Ref. 23, pp. 1,27
2-Methylphenol	MCC-WW03-11-100712	0.0618	0.029	mg/L	Ref. 22, pp. 9, 56; Ref. 23, pp. 1,27
3&4-Methylphenol	MCC-WW03-11-100712	0.519	0.029	mg/L	Ref. 22, pp. 9, 56; Ref. 23, pp. 1,27
Phenol	MCC-WW03-11-100712	0.499	0.029	mg/L	Ref. 22, pp. 9, 56; Ref. 23, pp. 1,27
bis(2-Ethylhexyl)phthalate	MCC-WW03-11-100712	0.0107 JQ	0.029	mg/L	Ref. 22, pp. 10, 56; Ref. 23, pp. 1,28
Antimony	MCC-WW03-11-100712	0.0027 JQ	0.0050	mg/L	Ref. 22, pp. 12, 56; Ref. 23, pp. 1,56
Arsenic	MCC-WW03-11-100712	0.0065	0.0050	mg/L	Ref. 22, pp. 12, 56; Ref. 23, pp. 1,56
Barium	MCC-WW03-11-100712	0.0102 JQ	0.20	mg/L	Ref. 22, pp. 12, 56; Ref. 23, pp. 1,56
Chromium	MCC-WW03-11-100712	0.0026 JQ	0.010	mg/L	Ref. 22, pp. 12, 56; Ref. 23, pp. 1,56
Cobalt	MCC-WW03-11-100712	0.0036	0.050	mg/L	Ref. 22, pp. 12, 56; Ref. 23, pp. 1,56
Lead	MCC-WW03-11-100712	0.0049	0.0030	mg/L	Ref. 22, pp. 12, 56; Ref. 23, pp. 1,56
Manganese	MCC-WW03-11-100712	0.0225	0.015	mg/L	Ref. 22, pp. 12, 56; Ref. 23, pp. 1,56
Nickel	MCC-WW03-11-100712	0.0675	0.040	mg/L	Ref. 22, pp. 12, 56; Ref. 23, pp. 1,56
Selenium	MCC-WW03-11-100712	0.0012 JQK	0.0050	mg/L	Ref. 22, pp. 12, 56; Ref. 23, pp. 1,56
Vanadium	MCC-WW03-11-100712	0.0018 JQ	0.050	mg/L	Ref. 22, pp. 12, 56; Ref. 23, pp. 1,56
Zinc	MCC-WW03-11-100712	0.055 JK	0.020	mg/L	Ref. 22, pp. 12, 56; Ref. 23, pp. 1,56
Acetone	MCC-WW04-11-100712	0.382	0.050	mg/L	Ref. 22, pp 13, 56; Ref. 23, pp. 1,8
Carbon disulfide	MCC-WW04-11-100712	0.0091	0.0020	mg/L	Ref. 22, pp 13, 56; Ref. 23, pp. 1,8
4-Methyl-2-pentanone	MCC-WW04-11-100712	0.0606 JK	0.010	mg/L	Ref. 22, pp 13, 56; Ref. 23, pp. 1,8
Methyl ethyl ketone	MCC-WW04-11-100712	0.160 JK	0.010	mg/L	Ref. 22, pp 13, 56; Ref. 23, pp. 1,8
Toluene	MCC-WW04-11-100712	0.0015 JQ	0.0020	mg/L	Ref. 22, pp 13, 56; Ref. 23, pp. 1, 8
Benzoic acid	MCC-WW04-11-100712	0.173	0.055	mg/L	Ref. 22, pp. 15, 56; Ref. 23, pp. 1, 30
2-Methylphenol	MCC-WW04-11-100712	0.0236 JQ	0.027	mg/L	Ref. 22, pp. 15, 56; Ref. 23, pp. 1, 30
3&4-Methylphenol	MCC-WW04-11-100712	0.0695	0.027	mg/L	Ref. 22, pp. 15, 56; Ref. 23, pp. 1, 30

Hazardous Substance	Evidence				References
	Sample ID	Concentration	RL/MQL[1]	Units	
Phenol	MCC-WW04-11-100712	0.0814	0.027	mg/L	Ref. 22, pp. 15, 56; Ref. 23, pp. 1, 30
bis(2-Ethylhexyl)phthalate	MCC-WW04-11-100712	0.0097 JQ	0.027	mg/L	Ref. 22, pp. 16, 56; Ref. 23, pp. 1, 31
Antimony	MCC-WW04-11-100712	0.0053	0.0050	mg/L	Ref. 22, pp.18, 56; Ref. 23, pp. 1, 57
Arsenic	MCC-WW04-11-100712	0.0068	0.0050	mg/L	Ref. 22, pp.18, 56; Ref. 23, pp. 1, 57
Barium	MCC-WW04-11-100712	0.0090 JQ	0.20	mg/L	Ref. 22, pp.18, 56; Ref. 23, pp. 1, 57
Chromium	MCC-WW04-11-100712	0.0030 JQ	0.010	mg/L	Ref. 22, pp.18, 56; Ref. 23, pp. 1, 57
Cobalt	MCC-WW04-11-100712	0.0058 JQ	0.050	mg/L	Ref. 22, pp.18, 56; Ref. 23, pp. 1, 57
Lead	MCC-WW04-11-100712	0.0071	0.0030	mg/L	Ref. 22, pp.18, 56; Ref. 23, pp. 1, 57
Manganese	MCC-WW04-11-100712	0.0144 JQ	0.015	mg/L	Ref. 22, pp.18, 56; Ref. 23, pp. 1, 57
Nickel	MCC-WW04-11-100712	0.0903	0.040	mg/L	Ref. 22, pp.18, 56; Ref. 23, pp. 1, 57
Selenium	MCC-WW04-11-100712	0.0028 JQK	0.0050	mg/L	Ref. 22, pp.18, 56; Ref. 23, pp. 1, 57
Vanadium	MCC-WW04-11-100712	0.0023 JQ	0.050	mg/L	Ref. 22, pp.18, 56; Ref. 23, pp. 1, 57
Zinc	MCC-WW04-11-100712	0.0638 JK	0.020	mg/L	Ref. 22, pp.18, 56; Ref. 23, pp. 1, 57
Acetone	MCC-WW05-11-100712	0.137	0.050	mg/L	Ref. 22, pp. 19, 56; Ref. 23, pp. 1, 10
Carbon disulfide	MCC-WW05-11-100712	0.0089	0.0020	mg/L	Ref. 22, pp. 19, 56; Ref. 23, pp. 1, 10
Methyl ethyl ketone	MCC-WW05-11-100712	0.0288 JK	0.010	mg/L	Ref. 22, pp. 19, 56; Ref. 23, pp. 1, 10
Toluene	MCC-WW05-11-100712	0.00061 JQ	0.0020	mg/L	Ref. 22, pp. 19, 56; Ref. 23, pp. 1, 10
Xylene (total)	MCC-WW05-11-100712	0.0026JQ	0.0060	mg/L	Ref. 22, pp. 20, 56; Ref. 23, pp. 1, 11
Benzoic acid	MCC-WW05-11-100712	0.357	0.055	mg/L	Ref. 22, pp. 21, 56; Ref. 23, pp. 1,33
2-Methylphenol	MCC-WW05-11-100712	0.0116 JQ	0.027	mg/L	Ref. 22, pp. 21, 56; Ref. 23, pp. 1, 33
3&4-Methylphenol	MCC-WW05-11-100712	0.157	0.027	mg/L	Ref. 22, pp. 21, 56; Ref. 23, pp. 1, 33
Phenol	MCC-WW05-11-100712	0.0259 JQ	0.027	mg/L	Ref. 22, pp. 21, 56; Ref. 23, pp. 1, 33
Arsenic	MCC-WW05-11-100712	0.0094	0.0050	mg/L	Ref. 22, pp. 24, 56; Ref. 23, pp. 1, 58
Chromium	MCC-WW05-11-100712	0.0079 JQ	0.010	mg/L	Ref. 22, pp. 24, 56; Ref. 23, pp. 1, 58
Cobalt	MCC-WW05-11-100712	0.0030 JQ	0.050	mg/L	Ref. 22, pp. 24, 56; Ref. 23, pp. 1, 58
Lead	MCC-WW05-11-100712	0.0064	0.0030	mg/L	Ref. 22, pp. 24, 56; Ref. 23, pp. 1, 58
Manganese	MCC-WW05-11-100712	0.0195	0.0015	mg/L	Ref. 22, pp. 24, 56; Ref. 23, pp. 1, 58
Nickel	MCC-WW05-11-100712	0.114	0.040	mg/L	Ref. 22, pp. 24, 56; Ref. 23, pp. 1, 58
Selenium	MCC-WW05-11-100712	0.0017 JQK	0.0050	mg/L	Ref. 22, pp. 24, 56; Ref. 23, pp. 1, 58
Vanadium	MCC-WW05-11-100712	0.0051 JQ	0.050	mg/L	Ref. 22, pp. 24, 56; Ref. 23, pp. 1, 58
Zinc	MCC-WW05-11-100712	0.142 JK	0.020	mg/L	Ref. 22, pp. 24, 56; Ref. 23, pp. 1, 58
Acetone	MCC-WW06-11-100712	0.387	0.050	mg/L	Ref. 22, pp. 25, 57; Ref. 23, pp. 1, 12
Benzene	MCC-WW06-11-100712	0.0017 JQ	0.0020	mg/L	Ref. 22, pp. 25, 57; Ref. 23, pp. 1, 12
Carbon disulfide	MCC-WW06-11-100712	0.0097	0.0020	mg/L	Ref. 22, pp. 25, 57; Ref. 23, pp. 1, 12
Ethylbenzene	MCC-WW06-11-100712	0.00079 JQ	0.0020	mg/L	Ref. 22, pp. 25, 57; Ref. 23, pp. 1, 12
4-Methyl-2-pentanone	MCC-WW06-11-100712	0.013 JK	0.010	mg/L	Ref. 22, pp. 25, 57; Ref. 23,pp. 1, 12
Methyl ethyl ketone	MCC-WW06-11-100712	0.078 JK	0.010	mg/L	Ref. 22, pp. 25, 57; Ref. 23, pp. 1, 12
Toluene	MCC-WW06-11-100712	0.0015 JQ	0.0020	mg/L	Ref. 22, pp. 25, 57; Ref. 23, pp. 1, 12

Hazardous Substance	Evidence				References
	Sample ID	Concentration	RL/MQL[1]	Units	
Xylene (total)	MCC-WW06-11-100712	0.0032 JQ	0.0060	mg/L	Ref. 22, pp. 26, 57; Ref. 23, pp. 1, 13
Benzoic acid	MCC-WW06-11-100712	0.366	0.055	mg/L	Ref. 22, pp. 27, 57; Ref. 23, pp. 1, 36
2-Methylphenol	MCC-WW06-11-100712	0.0299	0.027	mg/L	Ref. 22, pp. 27, 57; Ref. 23, pp. 1, 36
3&4-Methylphenol	MCC-WW06-11-100712	0.510	0.027	mg/L	Ref. 22, pp. 27, 57; Ref. 23, pp. 1, 36
Phenol	MCC-WW06-11-100712	0.142	0.027	mg/L	Ref. 22, pp. 27, 57; Ref. 23, pp. 1, 36
Arsenic	MCC-WW06-11-100712	0.0077	0.0050	mg/L	Ref. 22, pp. 30, 57; Ref. 23, pp. 1, 59
Barium	MCC-WW06-11-100712	0.0058 JQ	0.20	mg/L	Ref. 22, pp. 30, 57; Ref. 23, pp. 1, 59
Chromium	MCC-WW06-11-100712	0.0070 JQ	0.010	mg/L	Ref. 22, pp. 30, 57; Ref. 23, pp. 1, 59
Cobalt	MCC-WW06-11-100712	0.0026 JQ	0.050	mg/L	Ref. 22, pp. 30, 57; Ref. 23, pp. 1, 59
Lead	MCC-WW06-11-100712	0.0069	0.0030	mg/L	Ref. 22, pp. 30, 57; Ref. 23, pp. 1, 59
Manganese	MCC-WW06-11-100712	0.0483	0.015	mg/L	Ref. 22, pp. 30, 57; Ref. 23, pp. 1, 59
Nickel	MCC-WW06-11-100712	0.0902	0.040	mg/L	Ref. 22, pp. 30, 57; Ref. 23, pp. 1, 59
Selenium	MCC-WW06-11-100712	0.0027 JQK	0.0050	mg/L	Ref. 22, pp. 30, 57; Ref. 23, pp. 1, 59
Vanadium	MCC-WW06-11-100712	0.0055 JQ	0.050	mg/L	Ref. 22, pp. 30, 57; Ref. 23, pp. 1, 59
Zinc	MCC-WW06-11-100712	0.140 JK	0.020	mg/L	Ref. 22, pp. 30, 57; Ref. 23, pp. 1, 59
Acetone	MCC-WW07-12-100712	0.450	0.050	mg/L	Ref. 22, pp. 31, 57; Ref. 23, pp. 1, 14
Benzene	MCC-WW07-12-100712	0.0019 JQ	0.0020	mg/L	Ref. 22, pp. 31, 57; Ref. 23, pp. 1, 14
Carbon disulfide	MCC-WW07-12-100712	0.0082	0.0020	mg/L	Ref. 22, pp. 31, 57; Ref. 23, pp. 1, 14
Ethylbenzene	MCC-WW07-12-100712	0.0012 JQ	0.0020	mg/L	Ref. 22, pp. 31, 57; Ref. 23, pp. 1, 14
4-Methyl-2-pentanone	MCC-WW07-12-100712	0.0152	0.010	mg/L	Ref. 22, pp. 31, 57; Ref. 23, pp. 1, 14
Methyl ethyl ketone	MCC-WW07-12-100712	0.0932	0.010	mg/L	Ref. 22, pp. 31, 57; Ref. 23, pp. 1, 14
Toluene	MCC-WW07-12-100712	0.002	0.0020	mg/L	Ref. 22, pp. 31, 57; Ref. 23, pp. 1, 14
Xylene (total)	MCC-WW07-12-100712	0.0043 JQ	0.006	mg/L	Ref. 22, pp. 32, 57; Ref. 23, pp. 1, 15
Benzoic acid	MCC-WW07-12-100712	0.321	0.055	mg/L	Ref. 22, pp. 33, 57; Ref. 23, pp. 1, 39
2-Methylphenol	MCC-WW07-12-100712	0.0232 JQ	0.027	mg/L	Ref. 22, pp. 33, 57; Ref. 23, pp. 1, 39
3&4-Methylphenol	MCC-WW07-12-100712	0.362	0.027	mg/L	Ref. 22, pp. 33, 57; Ref. 23, pp. 1, 39
Phenol	MCC-WW07-12-100712	0.108	0.027	mg/L	Ref. 22, pp. 33, 57; Ref. 23, pp. 1, 39
bis(2-Ethylhexyl)phthalate	MCC-WW07-12-100712	0.012 JQ	0.027	mg/L	Ref. 22, pp. 34, 57; Ref. 23, pp. 1, 40
Naphthalene	MCC-WW07-12-100712	0.0068 JQ	0.027	mg/L	Ref. 22, pp. 34, 57; Ref. 23,pp. 1, 40
Arsenic	MCC-WW07-12-100712	0.0082	0.0050	mg/L	Ref. 22, pp. 36, 57; Ref. 23, pp. 1, 60
Barium	MCC-WW07-12-100712	0.0047 JQ	0.20	mg/L	Ref. 22, pp. 36, 57; Ref. 23, pp. 1, 60
Chromium	MCC-WW07-12-100712	0.0069 JQ	0.010	mg/L	Ref. 22, pp. 36, 57; Ref. 23, pp. 1, 60
Cobalt	MCC-WW07-12-100712	0.0025 JQ	0.050	mg/L	Ref. 22, pp. 36, 57; Ref. 23, pp. 1, 60
Lead	MCC-WW07-12-100712	0.0069	0.0030	mg/L	Ref. 22, pp. 36, 57; Ref. 23, pp. 1, 60
Manganese	MCC-WW07-12-100712	0.0462	0.015	mg/L	Ref. 22, pp. 36, 57; Ref. 23, pp. 1, 60
Nickel	MCC-WW07-12-100712	0.0901	0.040	mg/L	Ref. 22, pp. 36, 57; Ref. 23, pp. 1, 60
Selenium	MCC-WW07-12-100712	0.0013 JQK	0.0050	mg/L	Ref. 22, pp. 36, 57; Ref. 23, pp. 1, 60
Vanadium	MCC-WW07-12-100712	0.0055 JQ	0.050	mg/L	Ref. 22, pp. 36, 57; Ref. 23, pp. 1, 60

Hazardous Substance	Evidence				References
	Sample ID	Concentration	RL/MQL[1]	Units	
Zinc	MCC-WW07-12-100712	0.139 JK	0.020	mg/L	Ref. 22, pp. 36, 57; Ref. 23, pp. 1, 60
Acetone	MCC-WW08-11-100712	18.5 JL	1.30	mg/L	Ref. 22, pp. 37, 57; Ref. 23, pp. 1, 16
Benzene	MCC-WW08-11-100712	3.13 JL	0.050	mg/L	Ref. 22, pp. 37, 57; Ref. 23, pp. 1, 16
Chloroform	MCC-WW08-11-100712	0.0177 JL	0.010	mg/L	Ref. 22, pp. 37, 57; Ref. 23, pp. 1, 16
Carbon disulfide	MCC-WW08-11-100712	0.032 JL	0.010	mg/L	Ref. 22, pp. 37, 57; Ref. 23, pp. 1, 16
1,2-Dichloroethane	MCC-WW08-11-100712	0.991 JL	0.050	mg/L	Ref. 22, pp. 37, 57; Ref. 23, pp. 1, 16
1,2-Dichloropropane	MCC-WW08-11-100712	0.0053 JQL	0.010	mg/L	Ref. 22, pp. 37, 57; Ref. 23, pp. 1, 16
Ethylbenzene	MCC-WW08-11-100712	1.92 JL	0.050	mg/L	Ref. 22, pp. 37, 57; Ref. 23, pp. 1, 16
4-Methyl-2-pentanone	MCC-WW08-11-100712	2.10 JL	0.050	mg/L	Ref. 22, pp. 37, 57; Ref. 23, pp. 1, 16
Methylene chloride	MCC-WW08-11-100712	0.669 JL	0.010	mg/L	Ref. 22, pp. 37, 57; Ref. 23, pp. 1, 16
Methyl ethyl ketone	MCC-WW08-11-100712	2.75 JL	0.050	mg/L	Ref. 22, pp. 37, 57; Ref. 23, pp. 1, 16
Tetrachloroethylene	MCC-WW08-11-100712	0.0409 JL	0.010	mg/L	Ref. 22, pp. 37, 57; Ref. 23, pp. 1, 16
Toluene	MCC-WW08-11-100712	3.38 JL	0.050	mg/L	Ref. 22, pp. 37, 57; Ref. 23, pp. 1, 16
Trichloroethylene	MCC-WW08-11-100712	0.0479 JL	0.010	mg/L	Ref. 22, pp. 37, 57; Ref. 23, pp. 1, 16
Xylene (total)	MCC-WW08-11-100712	8.77 JL	0.150	mg/L	Ref. 22, pp. 38, 57; Ref. 23, pp. 1, 17
3&4-Methylphenol	MCC-WW08-11-100712	1.34	1.1	mg/L	Ref. 22, pp. 39, 57; Ref. 23, pp. 1, 42
Acenapthene	MCC-WW08-11-100712	0.847 JQ	1.1	mg/L	Ref. 22, pp. 39, 57; Ref. 23, pp. 1, 42
Di-n-butyl phthalate	MCC-WW08-11-100712	0.377 JQ	1.1	mg/L	Ref. 22, pp. 40, 57; Ref. 23, pp. 1, 43
bis(2-Ethylhexyl)phthalate	MCC-WW08-11-100712	0.926 JQ	1.1	mg/L	Ref. 22, pp. 40, 57; Ref. 23, pp. 1, 43
Fluorene	MCC-WW08-11-100712	0.465 JQ	1.1	mg/L	Ref. 22, pp. 40, 57; Ref. 23, pp. 1, 43
2-Methylnaphthalene	MCC-WW08-11-100712	9.44	1.1	mg/L	Ref. 22, pp. 40, 57; Ref. 23, pp. 1, 43
Naphthalene	MCC-WW08-11-100712	32.0	5.4	mg/L	Ref. 22, pp. 40, 57; Ref. 23, pp. 1, 43
Phenanthrene	MCC-WW08-11-100712	0.735 JQ	1.1	mg/L	Ref. 22, pp. 40, 57; Ref. 23, pp. 1, 43
Antimony	MCC-WW08-11-100712	0.637	0.0050	mg/L	Ref. 22, pp. 42, 57; Ref. 23, pp. 1, 61
Arsenic	MCC-WW08-11-100712	0.118	0.0050	mg/L	Ref. 22, pp. 42, 57; Ref. 23, pp. 1, 61
Barium	MCC-WW08-11-100712	19.5	0.20	mg/L	Ref. 22, pp. 42, 57; Ref. 23, pp. 1, 61
Cadmium	MCC-WW08-11-100712	0.0155	0.0040	mg/L	Ref. 22, pp. 42, 57; Ref. 23, pp. 1, 61
Chromium	MCC-WW08-11-100712	0.932	0.010	mg/L	Ref. 22, pp. 42, 57; Ref. 23, pp. 1, 61
Cobalt	MCC-WW08-11-100712	0.324	0.050	mg/L	Ref. 22, pp. 42, 57; Ref. 23, pp. 1, 61
Copper	MCC-WW08-11-100712	2.56	0.025	mg/L	Ref. 22, pp. 42, 57; Ref. 23, pp. 1, 61
Lead	MCC-WW08-11-100712	1.11	0.0030	mg/L	Ref. 22, pp. 42, 57; Ref. 23, pp. 1, 61
Manganese	MCC-WW08-11-100712	1.91	0.015	mg/L	Ref. 22, pp. 42, 57; Ref. 23, pp. 1, 61
Mercury	MCC-WW08-11-100712	0.264	0.020	mg/L	Ref. 22, pp. 42, 57; Ref. 23, pp. 1, 61
Nickel	MCC-WW08-11-100712	1.89	0.040	mg/L	Ref. 22, pp. 42, 57; Ref. 23, pp. 1, 61
Selenium	MCC-WW08-11-100712	0.0129 JL	0.0050	mg/L	Ref. 22, pp. 42, 57; Ref. 23, pp. 1, 61
Silver	MCC-WW08-11-100712	0.0227	0.010	mg/L	Ref. 22, pp. 42, 57; Ref. 23, pp. 1, 61
Vanadium	MCC-WW08-11-100712	0.548	0.050	mg/L	Ref. 22, pp. 42, 57; Ref. 23, pp. 1, 61
Zinc	MCC-WW08-11-100712	35.4 JK	0.10	mg/L	Ref. 22, pp. 42, 57; Ref. 23, pp. 1, 61

Hazardous Substance	Evidence				References
	Sample ID	Concentration	RL/MQL[1]	Units	
Acetone	MCC-WW09-11-10712	0.0783 JK	0.050	mg/L	Ref. 22, pp. 43, 57 Ref. 23, pp. 1, 18
Carbon disulfide	MCC-WW09-11-10712	0.0012 JQL	0.0020	mg/L	Ref. 22, pp. 43, 57 Ref. 23, pp. 1, 18
Ethylbenzene	MCC-WW09-11-10712	0.00092 JQL	0.0020	mg/L	Ref. 22, pp. 43, 57 Ref. 23, pp. 1, 18
Methyl ethyl ketone	MCC-WW09-11-10712	0.0087 JQL	0.010	mg/L	Ref. 22, pp. 43, 57; Ref. 23, pp. 1, 18
Toluene	MCC-WW09-11-10712	0.00081 JQL	0.0020	mg/L	Ref. 22, pp. 43, 57 Ref. 23, pp. 1, 18
Xylene (total)	MCC-WW09-11-10712	0.004 JQL	0.0060	mg/L	Ref. 22, pp. 44, 57; Ref. 23, pp. 1, 19
Chrysene	MCC-WW09-11-10712	0.0061 JQ	0.027	mg/L	Ref. 22, pp. 45, 57; Ref. 23, pp. 1, 45
bis(2-Ethylhexyl)phthalate	MCC-WW09-11-10712	0.0337	0.027	mg/L	Ref. 22, pp. 46, 57 Ref. 23, pp. 1, 46
Pyrene	MCC-WW09-11-10712	0.0105	0.027	mg/L	Ref. 22, pp. 46, 57 Ref. 23, pp. 1, 46
Antimony	MCC-WW09-11-10712	0.0130	0.0050	mg/L	Ref. 22, pp. 48, 58; Ref. 23, pp. 1, 62
Arsenic	MCC-WW09-11-10712	0.0083	0.0050	mg/L	Ref. 22, pp. 48, 58; Ref. 23, pp. 1, 62
Barium	MCC-WW09-11-10712	0.0056 JQ	0.20	mg/L	Ref. 22, pp. 48, 58; Ref. 23, pp. 1, 62
Chromium	MCC-WW09-11-10712	0.0080 JQ	0.010	mg/L	Ref. 22, pp. 48, 58; Ref. 23, pp. 1, 62
Cobalt	MCC-WW09-11-10712	0.0183 JQ	0.050	mg/L	Ref. 22, pp. 48, 58; Ref. 23, pp.1, 62
Lead	MCC-WW09-11-10712	0.0091	0.0030	mg/L	Ref. 22, pp. 48, 58; Ref. 23, pp. 1, 62
Manganese	MCC-WW09-11-10712	0.0946	0.015	mg/L	Ref. 22, pp. 48, 58; Ref. 23, pp. 1, 62
Nickel	MCC-WW09-11-10712	0.271	0.040	mg/L	Ref. 22, pp. 48, 58; Ref. 23, pp. 1, 62
Selenium	MCC-WW09-11-10712	0.0020 JQK	0.0050	mg/L	Ref. 22, pp. 48, 58; Ref. 23, pp. 1, 62
Vanadium	MCC-WW09-11-10712	0.0148 JQ	0.050	mg/L	Ref. 22, pp. 48, 58; Ref. 23, pp. 1, 62
Zinc	MCC-WW09-11-10712	0.0529 JK	0.020	mg/L	Ref. 22, pp. 48, 58; Ref. 23, pp. 1, 62
Bis(2-Ethylhexyl)phthalate	MCC-WW10-11-100712	0.0018 JQ	0.0050	mg/L	Ref. 22, pp.52, 58; Ref. 23, pp. 1, 49
Antimony	MCC-WW10-11-100712	0.0293	0.0050	mg/L	Ref. 22, pp. 54, 58; Ref. 23, pp. 1, 63
Barium	MCC-WW10-11-100712	0.101 JQ	0.20	mg/L	Ref. 22, pp. 54, 58; Ref. 23, pp. 1, 63
Manganese	MCC-WW10-11-100712	0.134	0.015	mg/L	Ref. 22, pp. 54, 58; Ref. 23, pp. 1, 63
Nickel	MCC-WW10-11-100712	0.0016 JQ	0.040	mg/L	Ref. 22, pp. 54, 58; Ref. 23, pp. 1, 63
Selenium	MCC-WW10-11-100712	0.0014 JQK	0.0050	mg/L	Ref. 22, pp. 54, 58; Ref. 23, pp. 1, 63
Zinc	MCC-WW10-11-100712	0.0762 JK	0.020	mg/L	Ref. 22, pp. 54, 58; Ref. 23, pp. 1, 63
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Carbon disulfide	WW-01-00-11-20110303	0.0111	0.002	mg/L	Ref. 24, pp. 159,325 ; Ref. 28, p. 73
Acetone	WW-01-00-11-20110303	2.83	1.0	mg/L	Ref. 24, pp. 159,325 ; Ref. 28, p. 73
Methyl acetate	WW-01-00-11-20110303	0.0044 J	0.002	mg/L	Ref. 24, pp. 159,325 ; Ref. 28, p. 73
Methyl tert-butyl ether	WW-01-00-11-20110303	0.0025	0.002	mg/L	Ref. 24, pp. 159,325 ; Ref. 28, p. 73
2-Butanone	WW-01-00-11-20110303	0.0812	0.005	mg/L	Ref. 24, pp. 159,325 ; Ref. 28, p. 73
Benzene	WW-01-00-11-20110303	0.0056 J	0.002	mg/L	Ref. 24, pp. 159,325 ; Ref. 28, p. 73
4-Methyl2-pentanone	WW-01-00-11-20110303	0.0274	0.005	mg/L	Ref. 24, pp. 160, 325 ; Ref. 28, p. 73
Toluene	WW-01-00-11-20110303	0.0335 J	0.002	mg/L	Ref. 24, pp. 160, 325 ; Ref. 28, p. 73
Ethylbenzene	WW-01-00-11-20110303	0.0621 J	0.002	mg/L	Ref. 24, pp. 160, 325 ; Ref. 28, p. 73
meta-/para-Xylene	WW-01-00-11-20110303	0.288 J	0.040	mg/L	Ref. 24, pp. 160, 325 ; Ref. 28, p. 73

Hazardous Substance	Evidence				References
	Sample ID	Concentration	RL/MQL[1]	Units	
ortho-Xylene	WW-01-00-11-20110303	0.093 J	0.002	mg/L	Ref. 24, pp. 160, 325 ; Ref. 28, p. 73
Benzoic acid	WW-01-00-11-20110303	1.82 J	1.0	mg/L	Ref. 24, pp. 161, 325 ; Ref. 28, p. 73
bis(2-Ethylhexyl)phthalate	WW-01-00-11-20110303	0.0942	0.05	mg/L	Ref. 24, pp. 161, 325 ; Ref. 28, p. 73
Caprolactum	WW-01-00-11-20110303	0.080	0.05	mg/L	Ref. 24, pp. 161, 325 ; Ref. 28, p. 73
2-Methylphenol	WW-01-00-11-20110303	0.0617	0.05	mg/L	Ref. 24, pp. 162, 325 ; Ref. 28, p. 73
3&/or4-Methylphenol	WW-01-00-11-20110303	0.732	0.05	mg/L	Ref. 24, pp. 162, 325 ; Ref. 28, p. 73
Naphthalene	WW-01-00-11-20110303	1.45	0.2	mg/L	Ref. 24, pp. 162, 325 ; Ref. 28, p. 73
Phenol	WW-01-00-11-20110303	0.774	0.05	mg/L	Ref. 24, pp. 163, 325 ; Ref. 28, p. 73
Manganese	WW-01-00-11-20110303	0.116	0.050	mg/L	Ref. 24, pp. 164, 325 ; Ref. 28, p. 73
Methylcyclohexane	SL-01-00-81	0.349	0.0998	mg/kg	Ref. 24, pp. 123, 325; Ref. 28, p. 72
Toluene	SL-01-00-81	0.971	0.0998	mg/kg	Ref. 24, pp. 124, 325; Ref. 28, p. 72
Ethylbenzene	SL-01-00-81	2.19	0.0998	mg/kg	Ref. 24, pp. 124, 325; Ref. 28, p. 72
meta-/para-Xylene	SL-01-00-81	15.6	0.2	mg/kg	Ref. 24, pp. 124, 325; Ref. 28, p. 72
ortho-Xylene	SL-01-00-81	6.87	0.0998	mg/kg	Ref. 24, pp. 124, 325; Ref. 28, p. 72
Isopropylbenzene	SL-01-00-81	0.429	0.0998	mg/kg	Ref. 24, pp. 124, 325; Ref. 28, p. 72
Acenaphthene	SL-01-00-81	26.2	9.0	mg/kg	Ref. 24, pp. 125, 325; Ref. 28, p. 72
1,1'-Biphenyl	SL-01-00-81	52.4	22.5	mg/kg	Ref. 24, pp. 125, 325; Ref. 28, p. 72
Bis(2-ethylhexyl)phthalate	SL-01-00-81	93.3	22.5	mg/kg	Ref. 24, pp. 125, 325; Ref. 28, p. 72
Chrysene	SL-01-00-81	31.2	22.5	mg/kg	Ref. 24, pp. 126, 325; Ref. 28, p. 72
Di-n-butyl phthalate	SL-01-00-81	59.3	22.5	mg/kg	Ref. 24, pp. 126, 325; Ref. 28, p. 72
Fluoranthene	SL-01-00-81	9.45	9.0	mg/kg	Ref. 24, pp. 126, 325; Ref. 28, p. 72
Fluorene	SL-01-00-81	28.6	9.0	mg/kg	Ref. 24, pp. 126, 325; Ref. 28, p. 72
2-Methylnaphthalene	SL-01-00-81	95	9.0	mg/kg	Ref. 24, pp. 126, 325; Ref. 28, p. 72
3-&/or4-Methylphenol	SL-01-00-81	137	22.5	mg/kg	Ref. 24, pp. 126, 325; Ref. 28, p. 72
Naphthalene	SL-01-00-81	140	9.0	mg/kg	Ref. 24, pp. 126, 325; Ref. 28, p. 72
Phenanthrene	SL-01-00-81	35.4	9.0	mg/kg	Ref. 24, pp. 127, 325; Ref. 28, p. 72
Pyrene	SL-01-00-81	52.2	9.0	mg/kg	Ref. 24, pp. 127, 325; Ref. 28, p. 72
Barium	SL-01-00-81	190	24.6	mg/kg	Ref. 24, pp. 128, 325; Ref. 28, p. 72
Chromium	SL-01-00-81	44.7	24.6	mg/kg	Ref. 24, pp. 128, 325; Ref. 28, p. 72
Copper	SL-01-00-81	105 K	49.2	mg/kg	Ref. 24, pp. 128, 325; Ref. 28, p. 72
Manganese	SL-01-00-81	87.2 K	12.3	mg/kg	Ref. 24, pp. 128, 325; Ref. 28, p. 72
Nickel	SL-01-00-81	87.8	49.2	mg/kg	Ref. 24, pp. 128, 325; Ref. 28, p. 72
Zinc	SL-01-00-81	1,890	49.2	mg/kg	Ref. 24, pp. 128, 325; Ref. 28, p. 72

Notes:
mg/L) milligrams per liter = 1,000 micrograms per liter (ug/L)
(mg/kg) milligrams per kilogram = 1,000 micrograms per kilogram (ug/kg)
J Identification of analyte is acceptable; the reported value is an estimate (Ref. 24, p. 328).
L Identification of analyte is acceptable; reported value may be biased low (Ref. 24, p. 328).
H Identification of analyte is acceptable; reported value may be biased high (Ref. 24, p.328).
Q The reported concentration is less than the reporting limit for this laboratory but greater than the method detection limit (Ref. 23, p. 5). For results flagged with a "Q", the laboratory used the Method Quantitation Limit (MQL) terminology in place of Sample

Quantitation Limit (SQL). No bias indicated (Ref. 23, p. 2).

[1] The Reporting Limit (RL) terminology used by the EPA Region 6 Laboratory and the Method Quantitation Limit (MQL) terminology used by Accutest Laboratory are both detection limits which have been adjusted for sample aliquot, sample volume, and dilutions for the analysis and meet the HRS definition of SQL (Ref. 1, Section 1.1 Ref. 24, p. 4; Ref. 26).

[2] All laboratory data collected during EPA emergency response activities July 2010 were validated by an EPA START-3 chemist in accordance with *EPA Quality Assurance/Quality Control Guidance for Removal Activities, OSWER Directive 9360.4-01* for definitive data use objectives and were found to be usable for the intended purpose. Data for target analytes meet the definitive data quality objective (Ref 23, pp. 5, 26, 55).

2.4.2 Hazardous Waste Quantity

2.4.2.1 Source Hazardous Waste Quantity

2.4.2.1.1 Tier A: Hazardous Constituent Quantity - Not Evaluated (NE)

The information available is not sufficient to determine with reasonable confidence a hazardous constituent quantity for Source 4 - Sumps (Ref. 1, Section 2.4.2.1.1). Scoring proceeds to the evaluation of Tier B, hazardous wastestream quantity (Ref. 1, Section 2.4.2.1.2).

2.4.2.1.2 Tier B: Hazardous Wastestream Quantity - Not Evaluated (NE)

The information available is not sufficient to determine with reasonable confidence a hazardous wastestream quantity for Source 4 (Ref. 1, Section 2.4.2.1.2). Scoring proceeds to the evaluation of Tier C, volume (Ref. 1, Section 2.4.2.1.3).

2.4.2.1.3 Tier C: Volume

The quantity volume of the surface impoundments was determined by measurements obtained on-site (Ref. 13, pp. 1-4). The surface impoundments and their volumes are as follows (Attachment A, Figure A-2B; Ref. 13, pp. 1-4):

Reservoir Name	Location	Volume (gallons)
Gravity Thickener	Located on eastern side of 200 N. Richey Street property at southwest corner	10,794
Final Clarifier	Located on western side of 200 N. Richey Street property on east side	293,640
Primary Clarifier	Located on western side of 200 N. Richey Street property on south side	48,937
Clarifier #1	Located on eastern side of 200 N. Richey Street property on north side	305,624
Clarifier #2	Located on eastern side of 200 N. Richey Street property on north side	297,141
Chlorine Contact Tank	Located on eastern side of 200 N. Richey Street property on northwest side	143,640
Oxygen Digester #1	Located on eastern side of 200 N. Richey Street property centrally located south of clarifiers	90,589

Reservoir Name	Location	Volume (gallons)
Oxygen Digester #2	Located on eastern side of 200 N. Richey Street property centrally located south of clarifiers	125,425
Headworks	Located on western side of 200 N. Richey Street property on north side	unknown
Total Reservoir Volume		**1,315,790**

The volume calculated for the surface impoundments is estimated to be 1,315,790 gallons. The Tier C equation for assigning a value for volumes of a source type "Tanks and Containers Other than Drums" is V/2.5 (Ref. 1, Table 2-5).

Volume of source (gallons): 1,315,790

1,315,790 gallons/201.97 (gallons per cubic yard) = 6,514.779 cubic yards

Volume Assigned Value = 6,514.779/2.5

Volume Assigned Value = 2,605.912

2.4.2.1.4 <u>Tier D: Area - Not Evaluated (NE)</u>

Tier C, volume, has already been determined; therefore, the value assigned for Tier D is not evaluated (Ref. 1, Section 2.4.2.1.4).

Area Assigned Value = 0

2.4.2.1.5 <u>Source Hazardous Waste Quantity Value</u>

Per the HRS, the highest of the values assigned to the source for hazardous constituent quantity (Tier A), hazardous wastestream quantity (Tier B), volume (Tier C), and area (Tier D) should be assigned as the source hazardous waste quantity value (Ref. 1, Section 2.4.2.1.5).

Tier Evaluated	Source 4 Values
A	Not Evaluated
B	Not Evaluated
C	2,605.912
D	0

Source Hazardous Waste Quantity Value: 2,605.912

SOURCE DESCRIPTION

2.2 Source Characterization

Source Description: Source 5 – Poly Totes (Flammable and Corrosive)

Two hundred twelve 400-gallon poly totes are located within the warehouse of the USOR property at 400 N. Richey. Of these, 20 totes contain corrosive hazardous waste and 62 totes contain flammable hazardous waste located within the Container Storage Area of the warehouse which is not authorized to store hazardous waste. The following was also noted during a 15 November 2009 TCEQ inspection: leaking containers; containers stored in an unsafe manner; universal waste not stored in double rows of containers separate from non-hazardous waste; inadequate aisle space; open containers storing waste; and storage of liquid waste (Ref. 8, pp. 8, 139, 144, 145; Ref. 43, pp. 6-10).

As part of the EPA ER activities conducted in July 2010, hazardous categorization was performed on the totes within the warehouse (Ref. 5, p. 75; Ref. 7, p. 19). EPA contractors found that the contents of the totes were not consistent with their labels. Most of the totes marked with "Universal Waste" labels contained flammables and corrosives (Ref. 5, pp. 19, 74-75; Ref. 7, p. 14). EPA contractors staged the totes within the warehouse according to their waste streams, and secondary containment areas were built to ensure containers were stable and not staged in an unsafe manner (Ref. 7, p. 19).

Source Type

The waste is contained in poly totes and, as such, the source type for Source 5 is "Tanks and Containers Other than Drums" (Ref. 1, Table 2-5; Ref. 7, p.19).

Source Location

The totes are currently located within the Container Storage Area of the warehouse on the USOR property at 400 N. Richey Street (Ref. 7, p. 19 Figure A-2A).

Source Containment

Release to Surface Water

Contents of the poly totes are exposed to precipitation and potentially surface water (through flooding and were in direct contact with floodwater (Ref. 6, pp. 68, 97, 100, 101, 102, 120, 187, 208, 211). On 16 November 2009, the TCEQ Region 12 Waste Program conducted an investigation at USOR and found unauthorized hazardous waste being stored in the container storage area. The following violations were observed in the container storage area: leaking containers; containers stored in an unsafe manner; universal waste not stored in double rows of containers; failure to ensure all containers of hazardous waste were closed or covered; failure to ensure waste was stored in leak free containers; failure to obtain a RCRA permit; and failure to prevent the discharge or imminent threat of discharge of industrial solid waste or municipal hazardous waste into the Vince Bayou (Ref. 8, p. 8). EPA documented that several of the totes were found in varying states of disrepair with evidence of leakage (Ref 7, pp. 18, 25; Ref. 43, pp. 6-10).

Since the EPA response activities in 2010 have placed the poly totes within secondary containment, a containment value of 9 was selected for Source 1 based on the current containment conditions, but the site is currently abandoned, and there is no maintenance of the containment area (Ref. 1, Table 4-2).

Containment Value: 9

2.4.1 Hazardous Substances

As part of the EPA supplemental sampling of the USOR site on 01 through 04 March 2011, EPA START-3 collected waste samples from two of the poly totes (T0126 and T0212) (Ref. 28, p. 73; Ref. 44, p. 4). These poly totes were located within the warehouse of the USOR property at 400 N. Richey Street (Ref. 28, p. 73). Totes T0126 and T0212 were sampled based on their hazardous categorization results and were identified by EPA START-3 as a Non-Flammable Liquid and as a Flammable Solid, respectively (Ref. 10, pp. 81, 86). The samples were analyzed for VOCs and SVOCs by CLP OLM04.2 and for TAL metals and mercury by CLP ISM05.3 by the EPA Region 6 Environmental Services Branch Laboratory (Ref. 28, p. 74; Ref. 24, pp. 183-194, 326).

Analytical evidence of the contamination in waste source samples associated with Source 5 located on the USOR site is summarized in the following table.

Hazardous Substance	Evidence			Units	References
	Sample ID	Concentration	Reporting Limit[1]		
EPA Supplemental Sampling Activities – March 2011					
Acetone	T0126-00-81	4,300 J	2,500	mg/L	Ref. 24, pp. 183, 326; Ref. 28, p. 73
Methylene chloride	T0126-00-81	3.56 J	2	mg/L	Ref. 24, pp. 183, 326; Ref. 28, p. 73
Methyl acetate	T0126-00-81	97.7 J	2	mg/L	Ref. 24, pp. 183, 326; Ref. 28, p. 73
2-Butanone	T0126-00-81	41,000 J	1,250	mg/L	Ref. 24, pp. 183, 326; Ref. 28, p. 73
Chloroform	T0126-00-81	95.2 J	2	mg/L	Ref. 24, pp. 183, 326; Ref. 28, p. 73
4-Methyl-2-pentanone	T0126-00-81	115	5	mg/L	Ref. 24, pp. 184, 326; Ref. 28, p. 73
Toluene	T0126-00-81	2.51 J	2	mg/L	Ref. 24, pp. 184, 326; Ref. 28, p. 73
Ethylbenzene	T0126-00-81	3.6 J	2	mg/L	Ref. 24, pp. 184, 326; Ref. 28, p. 73
meta-/para-Xylene	T0126-00-81	13.1 J	4	mg/L	Ref. 24, pp. 184, 326; Ref. 28, p. 73
ortho-Xylene	T0126-00-81	5.81 J	2	mg/L	Ref. 24, pp. 184, 326; Ref. 28, p. 73
Benzyl alcohol	T0126-00-81	47.1	5	mg/L	Ref. 24, pp. 185, 326; Ref. 28, p. 73
Butyl benzyl phthalate	T0126-00-81	12.8	5	mg/L	Ref. 24, pp. 185, 326; Ref. 28, p. 73
Naphthalene	T0126-00-81	3.14	2	mg/L	Ref. 24, pp. 186, 326; Ref. 28, p. 73
Phenol	T0126-00-81	20.1 J	5	mg/L	Ref. 24, pp. 187, 326; Ref. 28, p. 73
Chromium	T0126-00-81	3.26	0.0806	mg/L	Ref. 24, pp. 188, 326; Ref. 28, p. 73
Zinc	T0126-00-81	0.192	0.161	mg/L	Ref. 24, pp. 188, 326; Ref. 28, p. 73
Benzaldehyde	T0212-00-81	0.787 BJ	0.755	mg/kg	Ref. 24, pp. 191, 326; Ref. 28, p. 73
Phenol	T0212-00-81	0.864 BJ	0.755	mg/kg	Ref. 24, pp. 193, 326; Ref. 28, p. 73

Hazardous Substance	Evidence			Units	References
	Sample ID	Concentration	Reporting Limit[1]		
Methyl acetate	T0212-00-81	4.78	0.25	mg/kg	Ref. 24, pp. 189, 326; Ref. 28, p. 73
Chromium	T0212-00-81	88.1	13.2	mg/kg	Ref. 24, pp. 194, 326; Ref. 28, p. 73
Manganese	T0212-00-81	551 K	6.6	mg/kg	Ref. 24, pp. 194, 326; Ref. 28, p. 73
Nickel	T0212-00-81	205	26.3	mg/kg	Ref. 24, pp. 194, 326; Ref. 28, p. 73
Vanadium	T0212-00-81	32.7	26.3	mg/kg	Ref. 24, pp. 194, 326; Ref. 28, p. 73
Zinc	T0212-00-81	32.7	26.3	mg/kg	Ref. 24, pp. 194, 326; Ref. 28, p. 73

Notes:
(mg/L) milligrams per liter = 1,000 micrograms per liter (ug/L)
(mg/kg) milligrams per kilogram = 1,000 micrograms per kilogram (ug/kg)
J Identification of analyte is acceptable; the reported value is an estimate (Ref. 24, p. 328).
B Blank related – the concentration found in the sample was less than 10X the concentration found in the associated extraction, digestion and/or analysis blank.(Ref. 24, p. 328).
K The identification of the analyte is acceptable; the reported value may be biased high (for data analyzed by the EPA Region 6 Environmental Services Branch Laboratory) (Ref. 24, p. 328).

[1] The Reporting Limit (RL) terminology used by the EPA Region 6 Laboratory is a detection limit which has been adjusted for sample aliquot, sample volume, and dilutions for the analysis and meets the HRS definition of SQL (Ref. 1, Section 1.1; Ref. 24, p. 4; Ref. 26).

2.4.2 Hazardous Waste Quantity

2.4.2.1 Source Hazardous Waste Quantity

2.4.2.1.1 Tier A: Hazardous Constituent Quantity - Not Evaluated (NE)

The information available is not sufficient to determine with reasonable confidence a hazardous constituent quantity for Source 5 (Ref. 1, Section 2.4.2.1.1). Scoring proceeds to the evaluation of Tier B, hazardous wastestream quantity (Ref. 1, Section 2.4.2.1.2).

2.4.2.1.2 Tier B: Hazardous Wastestream Quantity

As part of the EPA emergency response activities, 212 400-gallon totes were found within the warehouse of the centralized waste treatment property at 400 N. Richey. Of these, 20 totes contain corrosive, and 62 totes contain flammable hazardous waste (Ref. 7, p. 19; Ref. 8, p. 8; Ref. 10, pp. 73-86; Ref. 43, pp. 6-10). The remaining 130 totes stored at the facility were not included in the source hazardous wastestream quantity calculation since HAZCAT results did not identify their contents as RCRA hazardous waste exhibiting the characteristics indentified under Section 3001 of RCRA as amended (Ref. 1, Section 2.4.2.1.2; Ref. 10, pp. 73-86). The volume of each tote was estimated during container inventory and HAZCAT activities conducted during the July 2010 EPA Emergency Response as presented below (Ref. 7, p. 19, Ref. 10, pp. 73-86). During EPA response activities in July 2010, the totes were separated into waste streams that contained similar chemical traits using HAZCAT techniques (Ref. 7, p. 19). The following table presents a summary of the waste streams identified and their quantities (Ref. 10 pp. 73-86).

Waste Stream	Matrix	Volume (Approx. Gal)	Reference
Corrosive Acid	Liquid	1460	Ref. 10, pp. 79, 80, 82, 84, 85
Corrosive Base	Liquid	2010	Ref. 10, pp. 73, 76, 79, 81, 85
Flammable	Liquid	19070	Ref. 10, pp. 73, 75-86
Flammable, Corrosive Acid	Liquid	20	Ref. 10, p. 86
Flammable, Corrosive Base	Liquid	800	Ref. 10, pp. 73, 75, 84
Subtotal Volume of Liquids			**23,360**
Corrosive Acid	Gel	8	Ref. 10, p. 84
Flammable	Gel	440	Ref. 10, pp. 74, 84
Subtotal Volume of Gel			**448**
Flammable, Corrosive Acid	Liquid/Solid	40	Ref. 10, p. 86
Subtotal Volume of Liquid/Solids			**40**
Corrosive Acid	Solid	120	Ref. 10, p. 84
Flammable	Solid	140	Ref. 10, pp. 80, 86
Subtotal Volume of Solids			**260**
Total Volume			**24,108**

The total volume of the totes (liquids and solids) was calculated based on the container size (400 gallons) and the content level of each tote determined during inventory (Ref. 10, pp. 73-86). The total volume of the totes containing hazardous substances equals 24,108 gallons. The Tier B equation for assigning a value for Hazardous Waste stream Quantity (W) is W (in pounds)/5,000 (Ref. 1, Table 2-5).

Volume of source (gallons): 24,108

1 gallon = 10 pounds (Ref. 1, Table 2-5)

24,108 gallons = 241,080 pounds (lbs)

Hazardous Waste stream Quantity = 241,080 lbs/5,000

Hazardous Waste stream Quantity = 48.216

2.4.2.1.3 Tier C: Volume - Not Evaluated (NE)

Tier B, the hazardous waste stream quantity of the source has been estimated with reasonable confidence, therefore the value assigned for Tier C is not evaluated (Ref. 1, Section 2.4.2.1.4).

Volume Assigned Value = Not Evaluated

2.4.2.1.4 Tier D: Area - Not Evaluated (NE)

Tier B, the hazardous waste stream quantity of the source has been estimated with reasonable confidence, therefore the value assigned for Tier D is not evaluated (Ref. 1, Section 2.4.2.1.4).

Area Assigned Value = Not Evaluated

2.4.2.1.5 Source Hazardous Waste Quantity Value

Per the HRS, the highest of the values assigned to the source for hazardous constituent quantity (Tier A), hazardous wastestream quantity (Tier B), volume (Tier C), and area (Tier D) should be assigned as the source hazardous waste quantity value (Ref. 1, Section 2.4.2.1.5).

Tier Evaluated	Source 5 Values
A	Not Evaluated
B	48.216
C	Not Evaluated
D	Not Evaluated

Source Hazardous Waste Quantity Value: 48.216

SOURCE DESCRIPTION

2.2 Source Characterization

<u>Source Description: Source 6 – Aboveground Tanks</u>

The tank farm located at the northwest corner of the USOR property consists of 24 aboveground storage tanks (ASTs). Twenty of the ASTs have a tank capacity of approximately 16,000 to 17,000 gallons, and four of the larger ASTs have a tank capacity of approximately 22,000 gallons. The majority of the tanks are full of a mixture of water, oily waste and sludge (Ref. 5, pp. 14, 66). These tanks have a combined storage capacity of approximately 440,000 gallons (Ref. 9, p. 2). These tanks are utilized to store hazardous waste; however, USOR is not authorized to store hazardous waste in these tanks or process hazardous waste (Ref. 9, p. 11).

During a 10 January 2006 TCEQ investigation, an unauthorized discharge was observed behind the tank farm where a black oily liquid had contaminated the ground. The impacted soil covered less than 10 square feet. Based on correspondences received from USOR on 2 March 2006, the spill was a result of a break in a pipe that discharged approximately 50 to 100 gallons of oily water that sprayed over the containment wall (Ref. 5, p. 486).

On 1 June 2006, a TCEQ investigator found fractures in the tank farm’s concrete secondary containment wall that showed seepage of oily liquid. The TCEQ investigator also observed oily waste migrating outside the secondary containment (Ref. 5, pp. 16, 495, 496). Several of the tanks were visibly leaking during emergency response activities conducted during July 2010 and November to December 2010 (Ref. 43, pp 3, 7, 23-25). As a result of several tanks leaking in the north tank farm, oily liquids and sludge from the tanks were drained into the containment area. Oily liquids and sludge from the tanks contained high levels of hydrogen sulfide and were neutralized for disposal as non-hazardous waste. A tank used to store acid was removed from the secondary containment area since the tank was leaking and had damaged the containment area berm. Concrete was poured into the acid containment area to repair the damaged berm (Ref. 5, pp. 20, 83).

<u>Source Type</u>

The waste contents are in aboveground storage tanks and, as such, the source type for Source 6 is “Tanks and Containers Other Than Drums” (Ref. 1, Table 2-5).

<u>Source Location</u>

The aboveground tanks are located at the USOR property located on the northwestern side of 400 N. Richey Street (Attachment A Figure A-2A; Ref. 14, p. 1).

<u>Source Containment</u>

Release To Surface Water

During an EPA Compliance Evaluation Inspection in November 2009, it was noted that the vents for all of the tanks located in the tank storage area (north end of warehouse) were open to the atmosphere. Ambient VOC readings reached 306 parts per million (ppm). There were no gauges on the tanks. All of the tanks were filled to capacity. It was noted that operators stop filling the tanks once they begin to overflow. Oil was present in the tank containment area (Ref. 9, p. 8). During EPA emergency response activities in November 2010, hydrogen sulfide was found at significant levels in the north tank farm during recovery operations (Ref. 7, p. 26).

During one large rainfall event in July 2010, EPA found that several secondary containment areas around the ASTs were overflowing and the contents were flowing off-site (Ref. 5, p. 19, 90-92). During that same rain event, TCEQ found secondary containment areas located in the tank farm were overflowing oily liquids into the parking lot area, which was then discharging down the property's front driveway and into Vince Bayou (Ref. 5, pp. 19, 88, 89). In November 2010, the available freeboard in the secondary containment areas had become compromised due to heavy rains and the contents were overflowing to the parking lot (Ref. 6, pp. 105, 226-231; Ref. 7, p. 22). On 1 June 2006, a TCEQ investigator found fractures in the tank farm's concrete secondary containment wall that showed seepage of oily liquid (Ref. 5, pp. 16, 495, 496).

Contents of the ASTs were exposed to precipitation and surface water (through flooding) (Ref. 6, pp. 97, 142, 187). Several of the tanks were visibly leaking during emergency response activities conducted during July 2010 and November to December 2010 (Ref. 43, pp 3, 7, 23-25). As a result of several tanks leaking in the north tank farm, oily liquids and sludge from the tanks were drained into the containment area. Oily liquids and sludge from the tanks contained high levels of hydrogen sulfide and were neutralized to dispose of as non-hazardous waste. A tank used to store acid was removed from the secondary containment area since the tank was leaking and had damaged the containment area berm. Concrete was poured into the acid containment area to repair the damaged berm (Ref. 5, pp. 20, 83).

A containment value of 10 was selected for Source 6, Tanks and Containers Other Than Drums, based on evidence of hazardous substance migration from the containers into the secondary containment area around the drums and diking surrounding the container storage area was observed to be unsound (Ref. 1, Table 4-2).

Containment Value: 10

2.4.1 Hazardous Substances

On 15 and 16 November 2010, as part of EPA's emergency response activities, EPA START-3 collected two sludge samples from within the containment areas of the ASTs. One composite sample was collected from the North Tank Farm secondary containment (WP01) , one composite sample was collected from the South Tank Farm secondary containment (WP02) (Ref. 28, pp. 18, 22). The samples were hand delivered to Accutest Laboratories located in Houston, Texas. The samples were analyzed for Toxicity Characteristic Leaching Procedure (TCLP) VOCs by SW846 1311/8260B, TCLP SVOCs by SW846 1311/8270C, and Resource Conservation and Recovery Act (RCRA) list total and TCLP metals with mercury by SW846 1311/6010B/7470A (Ref. 45, p. 24).

As part of supplemental sampling of the USOR site, EPA START-3 collected waste samples from two ASTs located on the north tank farm of 400 N. Richey Street (NTF-01-00-81 and NTF-02-00-81) (Ref.

28, p. 73; Ref. 44, p. 4). The samples were analyzed for VOCs and SVOCs by CLP OLM04.2 and for TAL metals and mercury by CLP ISM05.3 by the EPA Region 6 Environmental Services Branch Laboratory (Ref. 24, pp. 195-206, 327; Ref. 28, p. 73; Ref. 45, pp. 8-17, 24).

Analytical evidence of the contamination in waste source samples associated with the ASTs and their associated secondary containments located on the USOR site is summarized in the following table.

Hazardous Substance	Evidence				References
	Sample ID	Concentration	MQL/RL[1]	Units	
EPA Emergency Response Activities – November 2010[2]					
Benzene	WP01-71-101115	3.75[3]	0.25	mg/L	Ref. 45, pp. 8, 24; Ref.49, pp. 1,6
Methyl ethyl ketone	WP01-71-101115	0.695[3]	0.50	mg/L	Ref. 45, pp. 8, 24; Ref.49, pp. 1,6
2-Methylphenol	WP01-71-101115	0.0878[3]	0.050	mg/L	Ref. 45, pp. 9, 24;Ref.49, pp. 9,14
3&4-Methylphenol	WP01-71-101115	0.471[3]	0.050	mg/L	Ref. 45, pp. 9, 24; Ref.49, pp. 9, 14
Arsenic	WP01-71-101115	0.027 B[3]	0.050	mg/L	Ref. 45, pp. 10, 24; Ref.49, p. 17
Barium	WP01-71-101115	0.42 B[3]	5.0	mg/L	Ref. 45, pp. 10, 24; Ref.49, p. 17
Lead	WP01-71-101115	0.011 B[3]	0.025	mg/L	Ref. 45, pp. 10, 24; Ref.49, p. 17
Arsenic	WP01-71-101115	39.3	0.83	mg/kg	Ref. 45, pp. 12, 24; Ref.49, pp. 17, 22
Barium	WP01-71-101115	1790	17	mg/kg	Ref. 45, pp. 12, 24; Ref.49, pp. 17, 22
Cadmium	WP01-71-101115	1.2	0.41	mg/kg	Ref. 45, pp. 12, 24; Ref.49, pp. 17, 22
Chromium	WP01-71-101115	78.7	0.83	mg/kg	Ref. 45, pp. 12, 24; Ref.49, pp. 17, 22
Lead	WP01-71-101115	133	0.83	mg/kg	Ref. 45, pp. 12, 24; Ref.49, pp. 17, 22
Mercury	WP01-71-101115	15.3	1.2	mg/kg	Ref. 45, pp. 12, 24; Ref.49, pp. 17, 22
Silver	WP01-71-101115	1.5	0.83	mg/kg	Ref. 45, pp. 12, 24; Ref.49, pp. 17, 22
Benzene	WP02-71-101116	0.0322[3]	0.25	mg/L	Ref. 45, pp. 13, 24; Ref.49, pp. 1,7
Methyl ethyl ketone	WP02-71-101116	0.702[3]	0.50	mg/L	Ref. 45, pp. 13, 24; Ref.49, pp. 1,7
2-Methylphenol	WP02-71-101116	0.0384[3]	0.050	mg/L	Ref. 45, pp. 14, 24; Ref.49, pp. 9, 15
3&4-Methylphenol	WP02-71-101116	0.232[3]	0.050	mg/L	Ref. 45, pp. 14, 24; Ref.49, pp. 9, 15
Arsenic	WP02-71-101116	0.023 B[3]	0.050	mg/L	Ref. 45, pp. 15, 24; Ref.49, p. 17
Barium	WP02-71-101116	0.15 B[3]	5.0	mg/L	Ref. 45, pp. 15, 24; Ref.49, p. 17
Chromium	WP02-71-101116	0.015 B[3]	0.050	mg/L	Ref. 45, pp. 15, 24; Ref.49, p. 17
Lead	WP02-71-101116	0.012 B[3]	0.025	mg/L	Ref. 45, pp. 15, 24; Ref.49, p. 17
Mercury	WP02-71-101116	0.0096[3]	0.0020	mg/L	Ref. 45, pp. 15, 24; Ref.49, p. 17
Selenium	WP02-71-101116	0.029 B[3]	0.25	mg/L	Ref. 45, pp. 15, 24; Ref.49, p. 17

Hazardous Substance	Evidence				References
	Sample ID	Concentration	MQL/RL[1]	Units	
Arsenic	WP02-71-101116	13.7	1.4	mg/kg	Ref. 45, pp. 17, 24; Ref.49, pp. 17, 23
Barium	WP02-71-101116	1720	28	mg/kg	Ref. 45, pp. 17, 24; Ref.49, pp. 17, 23
Cadmium	WP02-71-101116	1.6	0.69	mg/kg	Ref. 45, pp. 17, 24; Ref.49, pp. 17, 23
Chromium	WP02-71-101116	101	1.4	mg/kg	Ref. 45, pp. 17, 24; Ref.49, pp. 17, 23
Lead	WP02-71-101116	96.6	1.4	mg/kg	Ref. 45, pp. 17, 24; Ref.49, pp. 17, 23
Mercury	WP02-71-101116	45.1	2.1	mg/kg	Ref. 45, pp. 17, 24; Ref.49, pp. 17, 23
Selenium	WP02-71-101116	0.46 B	1.4	mg/kg	Ref. 45, pp. 17, 24; Ref.49, pp. 17, 23
Silver	WP02-71-101116	1.5	1.4	mg/kg	Ref. 45, pp. 17, 24; Ref.49, pp. 17, 23
EPA Supplemental Sampling Activities – March 2011					
Acetone	NFT-01-00-81	70.5	10	mg/L	Ref. 24, pp. 195, 327; Ref. 28, p. 73
Methyl tert-butyl ether	NFT-01-00-81	2.38	0.2	mg/L	Ref. 24, pp. 195, 327; Ref. 28, p. 73
2-Butanone	NFT-01-00-81	90.2	5.0	mg/L	Ref. 24, pp. 195, 327; Ref. 28, p. 73
Cyclohexane	NFT-01-00-81	0.670	0.2	mg/L	Ref. 24, pp. 195, 327; Ref. 28, p. 73
Benzene	NFT-01-00-81	9.65	0.2	mg/L	Ref. 24, pp. 195, 327; Ref. 28, p. 73
Methylcyclohexane	NFT-01-00-81	0.555	0.2	mg/L	Ref. 24, pp. 195, 327; Ref. 28, p. 73
4-methyl-2-pentanone	NFT-01-00-81	2.4	0.5	mg/L	Ref. 24, pp. 196, 327; Ref. 28, p. 73
Toluene	NFT-01-00-81	14.0	0.2	mg/L	Ref. 24, pp. 196, 327; Ref. 28, p. 73
Ethylbenzene	NFT-01-00-81	10.4	0.2	mg/L	Ref. 24, pp. 196, 327; Ref. 28, p. 73
meta-/para-Xylene	NFT-01-00-81	32.4	4.0	mg/L	Ref. 24, pp. 196, 327; Ref. 28, p. 73
ortho-Xylene	NFT-01-00-81	14.8	0.2	mg/L	Ref. 24, pp. 196, 327; Ref. 28, p. 73
Styrene	NFT-01-00-81	1.01	0.2	mg/L	Ref. 24, pp. 196, 327; Ref. 28, p. 73
Isopropylbenzene	NFT-01-00-81	0.65	0.2	mg/L	Ref. 24, pp. 196, 327; Ref. 28, p. 73
Acenapthene	NFT-01-00-81	0.342	0.30	mg/L	Ref. 24, pp. 197, 327; Ref. 28, p. 73
Benzoic acid	NFT-01-00-81	29.8 J	27.0	mg/L	Ref. 24, pp. 197, 327; Ref. 28, p. 73
1,1’-Biphenyl	NFT-01-00-81	3.06	0.75	mg/L	Ref. 24, pp. 197, 327; Ref. 28, p. 73
2,4-Dimethylphenol	NFT-01-00-81	0.86	0.75	mg/L	Ref. 24, pp. 198, 327; Ref. 28, p. 73
Fluorene	NFT-01-00-81	0.489	0.30	mg/L	Ref. 24, pp. 198, 327; Ref. 28, p. 73
2-Methylnaphthalene	NFT-01-00-81	8.46	0.30	mg/L	Ref. 24, pp. 198, 327; Ref. 28, p. 73
2-Methylphenol	NFT-01-00-81	2.37	0.75	mg/L	Ref. 24, pp. 198, 327; Ref. 28, p. 73
3&/or4-Methylphenol	NFT-01-00-81	4.73	0.75	mg/L	Ref. 24, pp. 198, 327; Ref. 28, p. 73
Napthalene	NFT-01-00-81	40.9	6.0	mg/L	Ref. 24, pp. 198, 327; Ref. 28, p. 73
Phenanthrene	NFT-01-00-81	0.944	0.3	mg/L	Ref. 24, pp. 199, 327; Ref. 28, p. 73

Hazardous Substance	Evidence				References
	Sample ID	Concentration	MQL/RL[1]	Units	
Phenol	NFT-01-00-81	17.8	1.5	mg/L	Ref. 24, pp. 199, 327; Ref. 28, p. 73
Pyrene	NFT-01-00-81	0.50	0.3	mg/L	Ref. 24, pp. 199, 327; Ref. 28, p. 73
Barium	NFT-01-00-81	5.12	0.1	mg/L	Ref. 24, pp. 200, 327; Ref. 28, p. 73
Chromium	NFT-01-00-81	1.07	0.1	mg/L	Ref. 24, pp. 200, 327; Ref. 28, p. 73
Cobalt	NFT-01-00-81	0.367	0.2	mg/L	Ref. 24, pp. 200, 327; Ref. 28, p. 73
Copper	NFT-01-00-81	7.37	0.2	mg/L	Ref. 24, pp. 200, 327; Ref. 28, p. 73
Lead	NFT-01-00-81	1.48	0.3	mg/L	Ref. 24, pp. 200, 327; Ref. 28, p. 73
Manganese	NFT-01-00-81	14.3	0.05	mg/L	Ref. 24, pp. 200, 327; Ref. 28, p. 73
Nickel	NFT-01-00-81	2.65	0.2	mg/L	Ref. 24, pp. 200, 327; Ref. 28, p. 73
Vanadium	NFT-01-00-81	0.966	0.2	mg/L	Ref. 24, pp. 200, 327; Ref. 28, p. 73
Zinc	NFT-01-00-81	39.7	0.2	mg/L	Ref. 24, pp. 200, 327; Ref. 28, p. 73
Acetone	NTF-02-00-81	11.7	2.48	mg/kg	Ref. 24, pp. 201, 327; Ref. 28, p. 73
Methyl tert-butyl ether	NTF-02-00-81	2.24	0.0993	mg/kg	Ref. 24, pp. 201, 327; Ref. 28, p. 73
2-Butanone	NTF-02-00-81	17.3	1.24	mg/kg	Ref. 24, pp. 201, 327; Ref. 28, p. 73
Cyclohexane	NTF-02-00-81	4.17	0.496	mg/kg	Ref. 24, pp. 201, 327; Ref. 28, p. 73
Benzene	NTF-02-00-81	69.1	9.93	mg/kg	Ref. 24, pp. 201, 327; Ref. 28, p. 73
Trichloroethene	NTF-02-00-81	0.679	0.0993	mg/kg	Ref. 24, pp. 201, 327; Ref. 28, p. 73
Methylcyclohexane	NTF-02-00-81	6.32	0.496	mg/kg	Ref. 24, pp. 201, 327; Ref. 28, p. 73
4-Methyl-2-pentanone	NTF-02-00-81	3.92	1.24	mg/kg	Ref. 24, pp. 202, 327; Ref. 28, p. 73
Toluene	NTF-02-00-81	153	9.93	mg/kg	Ref. 24, pp. 202, 327; Ref. 28, p. 73
Tretrachloroethene	NTF-02-00-81	2.21 J	0.0993	mg/kg	Ref. 24, pp. 202, 327; Ref. 28, p. 73
Ethylbenzene	NTF-02-00-81	117	9.93	mg/kg	Ref. 24, pp. 202, 327; Ref. 28, p. 73
meta-/para-Xylene	NTF-02-00-81	455	19.9	mg/kg	Ref. 24, pp. 202, 327; Ref. 28, p. 73
ortho-Xylene	NTF-02-00-81	158	9.93	mg/kg	Ref. 24, pp. 202, 327; Ref. 28, p. 73
Styrene	NTF-02-00-81	12.5	0.496	mg/kg	Ref. 24, pp. 202, 327; Ref. 28, p. 73
Isopropylbenzene	NTF-02-00-81	9.24	0.496	mg/kg	Ref. 24, pp. 202, 327; Ref. 28, p. 73
Acenapthene	NTF-02-00-81	39.8	10.4	mg/kg	Ref. 24, pp. 203, 327; Ref. 28, p. 73
Anthracene	NTF-02-00-81	17.5	10.4	mg/kg	Ref. 24, pp. 203, 327; Ref. 28, p. 73
Benzo(a)anthracene	NTF-02-00-81	49.8	25.9	mg/kg	Ref. 24, pp. 203, 327; Ref. 28, p. 73
Benzo(a)pyrene	NTF-02-00-81	30.0	25.9	mg/kg	Ref. 24, pp. 203, 327; Ref. 28, p. 73
1,1’-Biphenyl	NTF-02-00-81	87.7	25.9	mg/kg	Ref. 24, pp. 203, 327; Ref. 28, p. 73
Bis(2-ethylhexyl)phthalate	NTF-02-00-81	39.4	25.9	mg/kg	Ref. 24, pp. 203, 327; Ref. 28, p. 73
Chrysene	NTF-02-00-81	78.2	25.9	mg/kg	Ref. 24, pp. 204, 327; Ref. 28, p. 73
Fluoranthene	NTF-02-00-81	13.3	10.4	mg/kg	Ref. 24, pp. 204, 327; Ref. 28, p. 73
Fluorene	NTF-02-00-81	48.9	10.4	mg/kg	Ref. 24, pp. 204, 327; Ref. 28, p. 73
2-Methylnapthalene	NTF-02-00-81	562	20.7	mg/kg	Ref. 24, pp. 204, 327; Ref. 28, p. 73
Naphthalene	NTF-02-00-81	1,700	207	mg/kg	Ref. 24, pp. 204, 327; Ref. 28, p. 73

Hazardous Substance	Evidence				References
	Sample ID	Concentration	MQL/RL[1]	Units	
Phenanthrene	NTF-02-00-81	149	10.4	mg/kg	Ref. 24, pp. 205, 327; Ref. 28, p. 73
Phenol	NTF-02-00-81	70.0	25.9	mg/kg	Ref. 24, pp. 205, 327; Ref. 28, p. 73
Pyrene	NTF-02-00-81	86.7 J	10.4	mg/kg	Ref. 24, pp. 205, 327; Ref. 28, p. 73
Barium	NTF-02-00-81	394	11.8	mg/kg	Ref. 24, pp. 206, 327; Ref. 28, p. 73
Chromium	NTF-02-00-81	61.7	11.8	mg/kg	Ref. 24, pp. 206, 327; Ref. 28, p. 73
Copper	NTF-02-00-81	345	23.6	mg/kg	Ref. 24, pp. 206, 327; Ref. 28, p. 73
Lead	NTF-02-00-81	86.4	35.4	mg/kg	Ref. 24, pp. 206, 327; Ref. 28, p. 73
Manganese	NTF-02-00-81	357	5.9	mg/kg	Ref. 24, pp. 206, 327; Ref. 28, p. 73
Nickel	NTF-02-00-81	114	23.6	mg/kg	Ref. 24, pp. 206, 327; Ref. 28, p. 73
Vanadium	NTF-02-00-81	134	23.6	mg/kg	Ref. 24, pp. 206, 327; Ref. 28, p. 73
Zinc	NTF-02-00-81	986	23.6	mg/kg	Ref. 24, pp. 206, 327; Ref. 28, p. 73

Notes:
(mg/L) milligrams per liter = 1,000 micrograms per liter (ug/L)
(mg/kg) milligrams per kilogram = 1,000 micrograms per kilogram (ug/kg)
J Identification of analyte is acceptable; the reported value is an estimate (Ref. 24, p. 328).
B Indicates a result is greater than or equal to the Sample Detection Limit but less than the MQL (Ref. 45, pp. 10, 12, 15, 17, 20).
1 The Reporting Limit (RL) terminology used by the EPA Region 6 Laboratory and the Method Quantitation Limit (MQL) terminology is used by Accutest Laboratory. Both the RL and the MQL are detection limits which have been adjusted for sample aliquot, sample volume, and dilutions for the analysis and each meets the HRS definition of SQL (Ref. 1, Section 1.1; Ref. 24, p. 4; Ref. 26).
2 All laboratory data collected during EPA emergency response activities conducted November 2010 were validated by an EPA START-3 chemist in accordance with *EPA Quality Assurance/Quality Control Guidance for Removal Activities, OSWER Directive 9360.4-01* for definitive data use objectives and were found to be usable for the intended purpose. Data for target analytes meet the definitive data quality objective (Ref 49, pp. 5, 13, 21, 31).
3 These concentrations reported from the TCLP Leachate of the sample.

2.4.2 Hazardous Waste Quantity

2.4.2.1 Source Hazardous Waste Quantity

2.4.2.1.1 Tier A: Hazardous Constituent Quantity - Not Evaluated (NE)

The information available is not sufficient to determine with reasonable confidence a hazardous constituent quantity for Source 6 (Ref. 1, Section 2.4.2.1.1). Scoring proceeds to the evaluation of Tier B, hazardous wastestream quantity (Ref. 1, Section 2.4.2.1.2).

2.4.2.1.2 Tier B: Hazardous Wastestream Quantity - Not Evaluated (NE)

The information available is not sufficient to determine with reasonable confidence a hazardous wastestream quantity for Source 6 (Ref. 1, Sec. 2.4.2.1.2). Scoring proceeds to the evaluation of Tier C, volume (Ref. 1, Sec. 2.4.2.1.3).

2.4.2.1.3 Tier C: Volume

Two of the 17,000 gallon ASTs were sampled and found to contain hazardous substances through sampling (Ref. 24, pp. 195-206; Ref. 28, p. 73; Ref. 44, p. 4). These tanks were found to full and contained oily waste and sludge (Ref. 5, pp. 14, 66). The Tier C equation for assigning a value for volume of Tanks and Containers Other Than Drums is V/2.5 (Ref. 1, Table 2-5).

2 ASTs x 17,000 gallons each = 34,000 gallons

Volume of source (gallons): 34,000

34,000 gallons/201.97 (gallons per cubic yard) = 168.342 cubic yards

Volume Assigned Value = 168.342/2.5

Volume Assigned Value = 67.337

2.4.2.1.4 Tier D: Area - Not Evaluated (NE)

Tier C, volume, has already been determined; therefore, the value assigned for Tier D is not evaluated(Ref. 1, Section 2.4.2.1.4).

Area Assigned Value = 0

Source Hazardous Waste Quantity Value

According to the HRS, the highest of the values assigned to the source for hazardous constituent quantity (Tier A), hazardous wastestream quantity (Tier B), volume (Tier C), and area (Tier D) should be assigned as the source hazardous waste quantity value (Ref. 1, Section 2.4.2.1.5).

Tier Evaluated	Source 6 Values
A	Not Evaluated
B	Not Evaluated
C	67.337
D	0

Source Hazardous Waste Quantity Value: 67.337

SOURCE DESCRIPTION

2.2 Source Characterization

<u>Source Description: Source 7 – Containment Pond</u>

A containment pond is located on the west side of the warehouse at 400 N. Richey Street. During an inspection conducted by EPA on 14 December 2009, a waste delivery truck was observed discharging D001 hazardous waste (ignitable waste) from a discharge valve located in the back of the truck to the containment pond (Ref. 9, p. 9). Earlier in the same month, EPA inspectors also observed the containment pond overflowing and its contents flowing off-site. A sheen was present in the off-site discharge (Ref. 9, p. 16).

<u>Source Type</u>

The waste contents are in a containment pond and as such, the source type for Source 7 is "Surface Impoundment" (Ref. 1, Table 2-5).

<u>Source Location</u>

The containment pond is located to the west of the warehouse located at 400 N. Richey Street (see Attachment A, Figure A-2A).

<u>Source Containment</u>

Release to Surface Water

During a 02 December 2009 EPA inspection, it was observed that the containment pond was overflowing and its contents flowing off-site. A sheen was present in the off-site discharge (Ref. 9, p. 16). During a 02 July 2010 EPA ER, EPA observed an uncontrolled release of liquids from the containment pond (Ref. 7, p. 3; Ref. 27, p. 4). Contents of the containment pond are exposed to precipitation and surface water (through flooding) (Ref. 6, pp. 63, 70, 108, 124). Although the pond is lined, there is evidence of hazardous substance migration through direct observation and no diking /secondary containment around the pond present (Ref. 6, pp. 63, 70, 108, 124; Ref. 9, p. 16; Ref. 43, pp. 21, 22).

A containment value of 10 was selected for the Source 6 based on evidence of hazardous substance migration and lack of diking/secondary containment (Ref. 1, Table 4-2).

Containment Value: 10

2.4.1 Hazardous Substances

On 05 July 2010, EPA START-3 collected a containment pond sample (SWP) from the surface of the northeast corner of the pond for laboratory analysis (Ref. 27, pp. 17, 18). The sample was hand delivered to Accutest Laboratories located in Houston, Texas. The sample was analyzed for VOCs by SW846 8260B, SVOC by SW846 8270C, and TAL metals with mercury by SW846 6010B/7470A (Ref. 27, p. 18; Ref. 32, pp. 7-12, 16, 17). Sample results for the containment pond indicate that the pond contained concentrations of acetone, phthalates and metals (Ref. 33, pp. 5, 15, 22).

Analytical evidence of the contamination in the source sample associated with Source 6, Surface Impoundment, located on the USOR site in the following table.

Hazardous Substance	Evidence			References
	Sample ID No.	Concentration mg/L	MQL[1] mg/L	
EPA Emergency Response Activities – July 2010[2]				
Acetone	SWP-05072010	0.0082 JQ	0.050	Ref. 32, p. 16; Ref. 33, pp. 1,5
Di-n-butyl phthalate	SWP-05072010	0.0011 JQ	0.005	Ref. 32, p. 16; Ref. 33, pp. 1,15
Bis(2-Ethylhexyl)phthalate	SWP-05072010	0.0041 JQ	0.005	Ref. 32, p. 16; Ref. 33, pp. 1,15
Arsenic	SWP-05072010	0.0123	0.0050	Ref. 32, p. 16; Ref. 33, pp. 1,22
Barium	SWP-05072010	0.0509 JQ	0.20	Ref. 32, p. 16; Ref. 33, pp. 1,22
Manganese	SWP-05072010	0.108	0.015	Ref. 32, p. 16; Ref. 33, pp. 1,22
Nickel	SWP-05072010	0.0428	0.040	Ref. 32, p. 16; Ref. 33, pp. 1,22
Vanadium	SWP-05072010	0.0018 JQ	0.050	Ref. 32, p. 16; Ref. 33, pp. 1,22
Zinc	SWP-05072010	0.0417	0.020	Ref. 32, p. 16; Ref. 33, pp. 1,22

Notes:
mg/L) milligrams per liter = 1,000 micrograms per liter (ug/L)
J The value is an estimated quantity (Ref. 33, p. 2).
Q The reported concentration is less than the Method Quantitation Limit but greater than the Sample Detection Limit (Ref. 33, p. 2).
1 The Laboratory used Method Quantitation Limit (MQL) terminology in place of RL or SQL. MQL is defined as the sample detection limit adjusted for sample aliquot, sample volume, and dilutions for the analysis (Ref. 26).
2 All laboratory data collected during EPA emergency response activities July 2010 were validated by a START chemist in accordance with *EPA Quality Assurance/Quality Control Guidance for Removal Activities, OSWER Directive 9360.4-01* for definitive data use objectives and were found to be usable for the intended purpose. All data for target analytes meet the definitive data quality objective (Ref. 33, pp. 4, 13, 21).

2.4.2 Hazardous Waste Quantity

2.4.2.1 Source Hazardous Waste Quantity

2.4.2.1.1 Tier A: Hazardous Constituent Quantity - Not Evaluated (NE)

The information available is not sufficient to determine with reasonable confidence a hazardous constituent quantity for Source 7 (Ref. 1, Section 2.4.2.1.1). Scoring proceeds to the evaluation of Tier B, hazardous wastestream quantity (Ref. 1, Section 2.4.2.1.2).

2.4.2.1.2 Tier B: Hazardous Wastestream Quantity - Not Evaluated (NE)

The information available is not sufficient determine with reasonable confidence a hazardous wastestream quantity for Source 7 (Ref. 1, Sec. 2.4.2.1.2). Scoring proceeds to the evaluation of Tier C, volume (Ref. 1, Sec. 2.4.2.1.3).

2.4.2.1.3 Tier C: Volume

The containment pond measures 240 feet long by 85 feet wide and 6 feet deep (Ref. 25, pp. 1, 2). The Tier C equation for assigning a value for volume of a Surface Impoundment is V/2.5 (Ref. 1, Table 2-5).

240 x 85 x 6 = 122,400 cubic feet

122,400 cubic feet /27 cubic feet per 1 cubic yard = 4,533.333 cubic yards

Volume of source (cubic yards): 4,533.333

Volume Assigned Value = 4,533.333/2.5

Volume Assigned Value = 1,813.333

2.4.2.1.4 Tier D: Area- Not Evaluated (NE)

Tier C, volume, has already been determined; therefore, the value assigned for Tier D is not evaluated (Ref. 1, Section 2.4.2.1.4).

Area Assigned Value = 0

Source Hazardous Waste Quantity Value

According to the HRS, the highest of the values assigned to the source for hazardous constituent quantity (Tier A), hazardous wastestream quantity (Tier B), volume (Tier C), and area (Tier D) should be assigned as the source hazardous waste quantity value (Ref. 1, Section 2.4.2.1.5).

Tier Evaluated	Source 4 Values
A	Not Evaluated
B	Not Evaluated
C	1,813.333
D	0

Source Hazardous Waste Quantity Value: 1,813.333

SOURCE DESCRIPTION

2.2 Source Characterization

<u>Source Description: Source 8 – Roll-Off Boxes</u>

Source 8 is being evaluated, but is not being used in scoring. It is included to show other waste identified at the Site.

Two hundred twenty-five 20 to 25-cubic yard roll-off boxes are located throughout the property at 400 N. Richey Street. Most of these roll-off boxes were labeled "Hazardous Waste October 2009" or "Hazardous Waste December 2009" (Ref. 5, pp, 14, 75). Many of these roll-off boxes were open to the elements and issues with these containers included leaks, tarps with holes, missing tarps, missing or damaged pipes, and missing or damaged bows; all of which can result in an overflow of material stored within them (Ref. 5, pp. 18-19, 62, 63, 288; Ref. 7, pp. 10-11; Ref. 43, pp. 4, 17-20). In July 2010, as part of the EPA ER activities, these roll-off boxes were securely covered to prevent rainwater from entering them causing them to overflow and pose an imminent threat to human health and the environment (Ref. 7, p. 11).

On 25 September 2009, USOR received a letter from the US Coast Guard requiring them to remove the contents of the bioreactors on-site. The two bioreactors had incurred partial structural failure from a spill incident that had occurred 14 March 2009 (Ref. 9, p. 5). On 01 October 2009, USOR began removing the bioreactor's contents and placing these contents into roll-off boxes and storing them on-site (Ref. 8, p. 3).

During a December 2009 EPA inspection, a roll-off box containing hazardous waste from the bioreactor was observed to be leaking. It was raining and the rain was washing the hazardous waste into the stormwater that was draining off-site(Ref. 9, p. 9).

In July 2010, EPA initiated an ER and removal action at the USOR site. EPA found the site to be abandoned with no restriction to public access, and that releases of hazardous substances were occurring at the site. Numerous roll-off boxes (labeled as containing hazardous waste) were filled with liquid that was overflowing onto the ground and migrating off-site. The majority of the roll-off boxes were not properly secured and were open to weather conditions (Ref. 5, p. 19, 62). During the July 2010 EPA Emergency Response, the content level of each of the roll-off boxes was measured and the total quantity of waste was calculated to be 2,833.25 cubic yards (Ref. 10, pp. 63-73).

<u>Source Type</u>

The waste is contained in roll-off boxes and, as such, the source type for Source 8 is "Tanks and Containers Other than Drums" (Ref. 1, Table 2-5; Ref. 7, pp. 10-11).

<u>Source Location</u>

The roll-off boxes are on the property at 400 N. Richey Street and are staged on the parking lots north, south, and east of the office/warehouse building (Ref. 8, pp. 4-5; Ref. 9, p. 6; Figure A-2A).

<u>Source Containment</u>

Release To Surface Water

During a December 2009 EPA Compliance Evaluation Inspection, roll-off boxes containing hazardous waste from the bioreactor were observed to be leaking. It was raining at the time of the inspection and the rain was washing the hazardous waste into the stormwater that was draining off-site (Ref. 9, pp. 9, 13). Contents of the roll-off boxes were exposed to precipitation and surface water (through flooding). An inspection of the roll-off boxes, as described in an October through November 2009 TCEQ Investigation Report, revealed that waste had spilled or leaked from a number of the containers. Although a plastic liner and aggregate were placed over the ground by USOR prior to putting the roll-off boxes in place, sludge and liquid that was released posed an imminent threat of environmental contamination because no berm or other means of confinement were installed around the plastic liner to prevent run-on and run-off of stormwater from the site. The boxes did not have a proper containment system applicable to hazardous waste containers (Ref. 8, pp. 9, 91-97, 102-109, 151-162). During the July 2010 EPA ER, material from the roll-off boxes labeled as containing hazardous waste and having no tarp cover was observed actively flowing from the roll-off boxes off-site (Ref. 7, p. 3; Ref. 43, pp. 4, 17, 19, 20).

A containment value of 10 was selected for Source 8 based on evidence of hazardous substance migration from the containers and no diking/secondary containment (or no similar structure) surrounding the roll-off boxes (Ref. 8, pp. 9, 91-97, 102-109, 151-162; Ref. 1, Table 4-2).

Containment Value: 10

2.4.1 Hazardous Substances

As part of supplemental sampling of the USOR site, EPA START-3 collected waste samples from one of the roll-off boxes (RO132) (Ref. 28, p. 73; Ref. 44, p. 4). The roll-off box was located on the parking lot of the USOR property at 400 N. Richey Street (Ref. 8, pp. 4-5; Ref. 9, p. 6). The sample was analyzed for VOCs and SVOCs by CLP OLM04.2 and for TAL metals and mercury by CLP ISM05.3 by the EPA Region 6 Environmental Services Branch Laboratory (Ref. 24, pp. 207-212, 327; Ref. 28, p. 73;).

Analytical evidence of the contamination in waste source samples associated with the Roll-Off Boxes located on the USOR site is summarized in the following table.

Hazardous Substance	Evidence			References
	Sample ID	Concentration (mg/kg)	Reporting Limit[1] (mg/kg)	
EPA Supplemental Sampling Activities – March 2011				
Acetone	RO132-01-00-81	5.18	1.59	Ref. 24, pp. 207, 327; Ref. 28, p.73

Hazardous Substance	Evidence			References
	Sample ID	Concentration (mg/kg)	Reporting Limit[1] (mg/kg)	
Methylene chloride	RO132-01-00-81	2.37	0.318	Ref. 24, pp. 207, 327; Ref. 28, p.73
2-Butanone	RO132-01-00-81	6.69	0.795	Ref. 24, pp. 207, 327; Ref. 28, p.73
Cyclohexane	RO132-01-00-81	1.95	0.318	Ref. 24, pp. 207, 327; Ref. 28, p.73
Benzene	RO132-01-00-81	13.5	0.318	Ref. 24, pp. 207, 327; Ref. 28, p.73
Trichloroethene	RO132-01-00-81	11.0	0.318	Ref. 24, pp. 207, 327; Ref. 28, p.73
Methylcyclohexane	RO132-01-00-81	2.11	0.318	Ref. 24, pp. 207, 327; Ref. 28, p.73
4-Methyl-2-pentanone	RO132-01-00-81	1.86	0.795	Ref. 24, pp. 208, 327; Ref. 28, p.73
Toluene	RO132-01-00-81	43.4	1.59	Ref. 24, pp. 208, 327; Ref. 28, p.73
Tetrachloroethene	RO132-01-00-81	3.42	0.318	Ref. 24, pp. 208, 327; Ref. 28, p.73
Ethylbenzene	RO132-01-00-81	84.5	1.59	Ref. 24, pp. 208, 327; Ref. 28, p.73
meta/para-Xylene	RO132-01-00-81	334 J	3.18	Ref. 24, pp. 208, 327; Ref. 28, p.73
ortho-Xylene	RO132-01-00-81	124	1.59	Ref. 24, pp. 208, 327; Ref. 28, p.73
Styrene	RO132-01-00-81	26.0	1.59	Ref. 24, pp. 208, 327; Ref. 28, p.73
Isopropylbenzene	RO132-01-00-81	11.0	0.318	Ref. 24, pp. 208, 327; Ref. 28, p.73
Acenaphthene	RO132-01-00-81	25.5	5.46	Ref. 24, pp. 209, 327; Ref. 28, p.73
Anthracene	RO132-01-00-81	12.0	5.46	Ref. 24, pp. 209, 327; Ref. 28, p.73
Benzo(a)anthracene	RO132-01-00-81	31.5	13.6	Ref. 24, pp. 209, 327; Ref. 28, p.73
1,1'-Biphenyl	RO132-01-00-81	61.2	13.6	Ref. 24, pp. 209, 327; Ref. 28, p.73
Bis(2-ethylhexyl)phthalate	RO132-01-00-81	63.1	13.6	Ref. 24, pp. 209, 327; Ref. 28, p.73
Butyl benzyl phthalate	RO132-01-00-81	16.8	13.6	Ref. 24, pp. 209, 327; Ref. 28, p.73
Chrysene	RO132-01-00-81	29.5	13.6	Ref. 24, pp. 210, 327; Ref. 28, p.73
Di-n-butyl phthalate	RO132-01-00-81	75.9	13.6	Ref. 24, pp. 210, 327; Ref. 28, p.73
Fluoranthene	RO132-01-00-81	17.5	5.46	Ref. 24, pp. 210, 327; Ref. 28, p.73
Fluorene	RO132-01-00-81	69.8	5.46	Ref. 24, pp. 210, 327; Ref. 28, p.73
2-Methylnapthalene	RO132-01-00-81	623	27.3	Ref. 24, pp. 210, 327; Ref. 28, p.73
Napthalene	RO132-01-00-81	1,330	54.6	Ref. 24, pp. 210, 327; Ref. 28, p.73
Phenanthrene	RO132-01-00-81	118	5.46	Ref. 24, pp. 211, 327; Ref. 28, p.73
Phenol	RO132-01-00-81	59.5 B	13.6	Ref. 24, pp. 211, 327; Ref. 28, p.73
Pyrene	RO132-01-00-81	6.28	5.46	Ref. 24, pp. 211, 327; Ref. 28, p.73
Barium	RO132-01-00-81	353	32.9	Ref. 24, pp. 212, 327; Ref. 28, p.73
Chromium	RO132-01-00-81	101	32.9	Ref. 24, pp. 212, 327; Ref. 28, p.73
Cobalt	RO132-01-00-81	182	65.9	Ref. 24, pp. 212, 327; Ref. 28, p.73
Copper	RO132-01-00-81	478	65.9	Ref. 24, pp. 212, 327; Ref. 28, p.73
Manganese	RO132-01-00-81	160	16.5	Ref. 24, pp. 212, 327; Ref. 28, p.73
Nickel	RO132-01-00-81	220	65.9	Ref. 24, pp. 212, 327; Ref. 28, p.73
Zinc	RO132-01-00-81	1,290	65.9	Ref. 24, pp. 212, 327; Ref. 28, p.73

Notes:

(mg/kg) milligrams per kilogram = 1,000 micrograms per kilogram (ug/kg)

B Blank related – the concentration found in the sample was less than 10X the concentration found in the associated extraction, digestion and/or analysis blank.(Ref. 24, p. 328).

[1] The Reporting Limit (RL) terminology used by the EPA Region 6 Laboratory is a detection limit which has been adjusted for sample aliquot, sample volume, and dilutions for the analysis and meets the HRS definition of SQL (Ref. 1, Section 1.1; Ref. 24, p. 4; Ref. 26).

2.4.2 Hazardous Waste Quantity

2.4.2.1 Source Hazardous Waste Quantity

2.4.2.1.1 Tier A: Hazardous Constituent Quantity - Not Evaluated (NE)

The information available is not sufficient to determine with reasonable confidence a hazardous constituent quantity for Source 8 (Ref. 1, Section 2.4.2.1.1). Scoring proceeds to the evaluation of Tier B, hazardous wastestream quantity (Ref. 1, Section 2.4.2.1.2).

2.4.2.1.2 Tier B: Hazardous Wastestream Quantity - Not Evaluated (NE)

The information available is not sufficient to determine with reasonable confidence a hazardous wastestream quantity for Source 8 (Ref. 1, Sec. 2.4.2.1.2). Scoring proceeds to the evaluation of Tier C, volume (Ref. 1, Sec. 2.4.2.1.3).

2.4.2.1.3 Tier C: Volume

During the July 2010 EPA Emergency Response, the content level of each of the roll-off boxes was measured and the total quantity of waste from them was calculated to be 2,833.25 cubic yards. This quantity was calculated based on the size of each roll-off (25 cubic yards) multiplied by the percent content found within each container (Ref. 10, pp. 63-73). The Tier C equation for assigning a value for volume of Tanks and Containers Other Than Drums is V/2.5 (Ref. 1, Table 2-5.While the calculation is shown, an actual value will not be assigned since this source is not being used to score the site.

Volume of source (cubic yards): 2,833.25

Volume Assigned Value = 2,833.25/2.5

Volume Assigned Value = 1,133.3

2.4.2.1.4 Tier D: Area - Not Evaluated (NE)

Tier C, volume, has already been determined; therefore, the value assigned for Tier D is not evaluated (Ref. 1, Section 2.4.2.1.4).

Area Assigned Value = 0

Source Hazardous Waste Quantity Value

No value was assigned for Source 8 since it is being presented only to show additional waste located on the site and is not being used for scoring

Tier Evaluated	Source 8 Values
A	Not Evaluated
B	Not Evaluated
C	1,133.3
D	0

Source Hazardous Waste Quantity Value: 1,133.3

SITE SUMMARY OF SOURCE DESCRIPTIONS

Source No.[1]	**Source Hazardous Waste Quantity Value**	**Containment**			
		Ground Water	**Surface Water**	**Gas**	**Air Particulate**
1	33.896	NE	9	NE	NE
2	1,173.333	NE	10	NE	NE
3	48.889	NE	10	NE	NE
4	2,605.912	NE	10	NE	NE
5	48.216	NE	9	NE	NE
6	67.337	NE	10	NE	NE
7	1,813.333	NE	10	NE	NE
TOTAL	5,790.916				

NE = Not Evaluated

[1] = In addition to these sources, another source (Source 8) is discussed in section 2.2 of this HRS documentation record.

3.0 <u>GROUND WATER MIGRATION PATHWAY SCORE</u> - NOT SCORED

The ground water migration pathway will not be scored because it is not expected to contribute significantly to the site score. The site score already exceeds 28.50 based only on the evaluation of the surface water pathway.

4.0 SURFACE WATER MIGRATION PATHWAY

4.1 OVERLAND/FLOOD MIGRATION COMPONENT

4.1.1 General Considerations

4.1.1.1 Definition of Hazardous Substance Migration Path for Overland/Flood Component

The hazardous substance migration path includes both the overland and the in-water segment that hazardous substances would take as they migrate away from sources at the site (Ref. 1, Section 4.1.1.1). Hazardous substance migration path overland and in-water segments for Sources 1 through 8 are described in the following text. The surface water pathway is presented on Figures A-3 and A-4.

Overland Segments

The topography of the USOR property is generally flat although there is a slight slope across most of the property to the north and east, towards the Vince Bayou (Ref. 5, p. 30). This slope increases to a moderate slope between the USOR property and the bayou (Ref. 3, p. 1). Stormwater from the majority of the USOR property drains to the northeast, north, and northwest into Vince Bayou. Stormwater that falls in the southern part of the USOR site flows south and east to either a bar ditch located along the west side of N. Richey Street or across N. Richey Street directly into Vince Bayou. The bar ditch conveys stormwater to Vince Bayou at the bridge where N. Richey Road crosses Vince Bayou (Ref. 3, p. 1; Ref. 5, pp. 30; Ref. 6, pp. 64, 65, 105, 112, 220, 221). During large rain events, the water from Vince Bayou covers N. Richey Street and part of the entrance drive to the USOR property (Ref. 6, pp. 66). During a large rain event, water from Vince Bayou was observed approximately 4 feet above the road at the intersection of N. Richey Street and the USOR property on 2 July 2010 (Ref. 6, pp. 66).

At the MCC property, surface water migrates to storm drains and Vince Bayou. The topographical across the west plant slopes to the east towards the bayou. The topographical slope towards most of the east plant runs west towards the bayou (Ref. 6, pp. 27, 788).

Source 1 – Drums (Flammable and Corrosive)
For Source 1, drainage flows out of the drums through open tops, corroded bottoms and/or sides, and due to lack of containment, through the doorways and cracks within the building walls and floor, and then outside of the warehouse to the east (Ref. 6, pp. 102, 208, 210-212). Drainage continues east through the parking lot and down the entrance drive into the site (which slopes to the east) and either continues across N. Richey Street into Vince Bayou from there (approximately 400 feet and downgradient from the source), or enters a bar ditch located along the west side of N. Richey Street that continues approximately 220 feet north and enters Vince Bayou at the bridge where N. Richey Street crosses Vince Bayou to the northeast of the site (Attachment A, Figure A-2A; Ref. 3, p. 1; Ref. 6, pp. 64, 65, 112; Ref. 15, pp.1-2). Vince Bayou constitutes the beginning of the in-water segment for the surface water pathway.

Source 2 – Bioreactors
For Source 2, located on the northwest side of the 400 N. Richey Street property, overland flow is to the north approximately 380 feet to Vince Bayou (Attachment A, Figure A-2A; Ref. 3, p. 1; Ref. 5, p. 30; Ref. 15, pp.1-2). Vince Bayou constitutes the beginning of the in-water segment for the surface

water pathway.

Source 3 –Truck Bays used as Sumps
For Source 3, drainage flows over the open tops and through the cracks of the truck bay sumps due their lack of freeboard and deteriorated conditions (Ref. 6, pp. 104, 106, 217, 218, 227, 229). Source 3 is located on the north side of the 400 N. Richey Street property and overland flow is downgradient to either the north approximately 250 feet or northeast approximately 200 feet to Vince Bayou (Attachment A, Figure A-2A; Ref. 3, p. 1; Ref. 5, p. 30; Ref. 15, pp.1-2). Vince Bayou constitutes the beginning of the in-water segment for the surface water pathway.

Source 4 – MCC Surface impoundments
For Source 2, drainage flows over the open tops of the surface impoundments due to lack of containment features and continues to flow downgradient (Ref. 6, pp. 71-76, 82-84, 128, 130, 133, 134, 145-149). From the Primary Clarifier, Aeration Basin (Final Clarifier), Lift Station 3, and Headworks (also known as oil water separator) located on the 200 N. Richey Street property (west side of Vince Bayou), the overland flow is to the northeast and flows approximately 50 feet to Vince Bayou. From the Digesters, Clarifiers, Chorine Contact Tank, Gravity Thickener and Lift Station 1 located on the 200 N. Richey Street property (east side of Vince Bayou), the overland flow is to the west and flows approximately 120 feet to Vince Bayou (Attachment A, Figure A-2B; Ref. 3, p. 1; Ref. 15, pp.1-2). Vince Bayou constitutes the beginning of the in-water segment for the surface water pathway.

Source 5 – Poly Totes (Flammable and Corrosive)
For Source 5, drainage flows out of the totes through opened bottoms and/or sides, and due to lack of containment, through the doorways and cracks within the building walls and floor and then outside of the warehouse to the east. Drainage continues east through the parking lot and down the entrance drive into the site (which slopes downgradient and to the east) and either continues across N. Richey Street into Vince Bayou (approximately 400 feet and downgradiant from the source), or enters a bar ditch located along the west side of N. Richey Street which continues approximately 220 feet north and enters Vince Bayou at the bridge where N. Richey Street crosses Vince Bayou to the northeast of the site (Attachment A, Figure A-2A; Ref. 3, p. 1; Ref. 6, pp. 64, 65, 112; Ref. 15, pp.1-2). Vince Bayou constitutes the beginning of the in-water segment for the surface water pathway.

Source 6 – Aboveground Storage Tanks
For Source 6, drainage flows from the leaking and open tanks, over the secondary containment which is inadequate to contain the liquids, and continues to flow downgradient to the north approximately 250 feet to Vince Bayou (Attachment A, Figure A-2A; Ref. 3, p. 1; Ref. 5, p. 23; Ref. 15, pp.1-2). Vince Bayou constitutes the beginning of the in-water segment for the surface water pathway.

Source 7 – Containment Pond
For Source 7, drainage flows over the edges of the containment pond (due to lack of containment features) to the north approximately 380 feet to Vince Bayou (Attachment A, Figure A-2A; Ref. 3, p. 1; Ref. 9, p. 16; Ref. 15, pp.1-2). Vince Bayou constitutes the beginning of the in-water segment for the surface water pathway.

Source 8 – Roll-Off Boxes
For Source 8, drainage occurs from four different paths from the roll-off boxes located throughout the site. For the roll-off boxes located to the east of the warehouse building, drainage continues east

through the parking lot and down the entrance drive into the site and continues across N. Richey Street into Vince Bayou (approximately 400 feet and downgradiant from the source), or enters a bar ditch located along the west side of N. Richey Street which continues approximately 220 feet north and enters Vince Bayou at the bridge where N. Richey Street crosses Vince Bayou to the northeast of the site. For the roll-off boxes located on the south side of the warehouse building, drainage is to the east approximately 150 feet to Vince Bayou. For the roll-off boxes located on the western side of the warehouse building, drainage is to the north approximately 380 feet to Vince Bayou (Attachment A, Figure A-2A; Ref. 3, p. 1; Ref. 6, pp. 64, 65, 112; Ref. 15, pp.1-2). Vince Bayou constitutes the beginning of the in-water segment for the surface water pathway.

In-Water Segments

The in-water segment begins at the Probable Point of Entry (PPE) to an eligible surface water body as defined in the HRS (Ref. 1, Sec. 4.1.1). Eligible surface water bodies that have been determined to be part of the in-water segment for the USOR site include Vince Bayou, Buffalo Bayou, the San Jacinto River, and several embayments which consist of Burnet Bay, Crystal Bay, Mitchell Bay, and Upper San Jacinto Bay (Attachment A, Figure A-4; Ref. 3, pp. 1-3). The aforementioned bays are tertiary bays to the Gulf of Mexico. Both Buffalo Bayou and the San Jacinto River are part of the Houston Ship Channel. All of the surface water bodies within the in-water segment are perennial and, therefore, eligible for HRS scoring (Ref. 1, Sec. 4.0.2; Ref. 3, pp. 1-3). The average annual rainfall at the US Oil Recovery site is approximately 54 inches (Ref. 16, p.1).

The target distance limit (TDL) for the surface water pathway, which defines the maximum distance over which targets are considered, is 15 miles. Although the eligible surface water bodies are tidally influenced, there are no significant upgradient targets; therefore, the tidal influence on the TDL was not evaluated (Ref. 1, Section 4.1.1.2; Ref. 51, p.1). The TDL is defined as being 15 miles from the farthest downstream PPE (i.e., PPE-06A) in the in-water segment section (Ref. 1, Sec. 4.1.1.2). The TDL of the surface water flow path is presented in Attachment A, Figure A-4 and is described in the following paragraphs.

Drainage from Sources 1 through 8 enters Vince Bayou at PPE-01 through PPE-06A **(**refer to Attachment A, Figure A-3). From PPE-1, the farthest downstream PPE, Vince Bayou flows for approximately 0.36 mile to its confluence with Buffalo Bayou (Houston Ship Channel). Buffalo Bayou (Houston Ship Channel) flows for approximately 10.3 miles before entering the San Jacinto River (Attachment A, Figure A-4; Ref. 3, pp. 1-3). The San Jacinto River within the in-water segment target distance limit has several embayments including Burnet Bay, Crystal Bay, Mitchell Bay, and Upper San Jacinto Bay (Attachment A, Figure A-4). Because of this, the surface water pathway within the San Jacinto River is measured as an arc rather than stream miles (Ref. 1, Sec. 4.1.1.1). Beginning at the confluence of Buffalo Bayou and the San Jacinto River, an arc with a radius of 4.34 miles was extended out to the terminus of the downgradient portion of the in-water segment (Attachment A, Figure A-4).

4.2 LIKELIHOOD OF RELEASE

4.2.1 Observed Release

Direct Observation

Direct observation has been established through materials seen entering the surface water by both migration and direct deposition. Additionally, evidence of sources flooding with material containing hazardous substances in direct contact with the surface water exists. Unpermitted discharges from the USOR site to Vince Bayou have been observed on several occasions by TCEQ, HCPHES and EPA personnel as presented in the following paragraphs (Ref. 6, pp. 18, 664-665; Ref. 9, p. 16; Ref. 12, pp. 23-25; Ref. 18, pp. 2-11).

In October 2009 and November 2009, HCPHES investigators observed discharges from the MCC Recycling property at 200 N. Richey Street into Vince Bayou. A ruptured 24-inch ribbed concrete pipe connected to the property was discovered discharging black effluent into Vince Bayou at a rate of approximately 200 gallons per minute (Ref. 18, pp. 3-6, 11). The pipe was found to be an abandoned main influent line which was connected to the lift station at the MCC property (Ref. 18, pp. 4, 7, 8, 27). On 23 and 27 October 2009, an HCPHES investigator collected samples labeled as Unknown, NA-26 from a black effluent which emitted a slight chemical odor and was observed flowing into Vince Bayou. These samples were located at Vince Bayou and West Richey Road, at the south side of the bridge and the east side of Vince Bayou (Ref. 18, pp. 3, 4, 7, 14, 20, 67; Ref. 54). Another sample was collected from the pipe at the line break (20126-01 24" Line Breaks) on 27 October 2009 (Ref. 18, pp. 7, 91, 97). Analytical results indicate that the discharged wastewater contained high concentrations of acetone, carbon disulfide, 2-butanone, 1,2-dichloroethane, benzene, 4-methyl-2-pentanone, toluene, ethylbenzene, and xylenes, as well as benzoic acid, phenols, and naphthalenes (Ref. 18, pp. 17-19, 72-73, 91-94). Analytical data from these discharges confirmed that the samples collected from the discharge point at Vince Bayou and the samples collected from the various tanks at the MCC property (East Digester, East Clarifier, West clarifier, West Digester, Lift Station) were substantially similar, and further confirmed that MCC was the source of the unauthorized discharges as shown in the table below (Ref. 18, pp. 10, 31-33, 39-41, 43, 47-49, 55-57, 63-65, 72-74, 79-81).

Hazardous Substance	Evidence			References
	Sample ID[1]	Concentration	Units	
HCPHES Investigation – October 2009				
Discharge Samples				
Acetone	UNKNOWN, NA-26 (10/23/2009)	7.1	mg/L	Ref. 18, pp. 17, 20
Carbon Disulfide	UNKNOWN, NA-26 (10/23/2009)	0.057	mg/L	Ref. 18, pp. 17, 20
2-Butanone	UNKNOWN, NA-26 (10/23/2009)	0.78	mg/L	Ref. 18, pp. 17, 20
1,2-Dichloroethane	UNKNOWN, NA-26 (10/23/2009)	0.053	mg/L	Ref. 18, pp. 17, 20

Hazardous Substance	Evidence			References
	Sample ID[1]	Concentration	Units	
Benzene	UNKNOWN, NA-26 (10/23/2009)	0.087	mg/L	Ref. 18, pp. 17, 20
4-Methyl-2-pentanone (MIBK)	UNKNOWN, NA-26 (10/23/2009)	0.45	mg/L	Ref. 18, pp. 17, 20
Toluene	UNKNOWN, NA-26 (10/23/2009)	0.1	mg/L	Ref. 18, pp. 17, 20
Ethylbenzene	UNKNOWN, NA-26 (10/23/2009)	0.15	mg/L	Ref. 18, pp. 17, 20
m/p Xylene	UNKNOWN, NA-26 (10/23/2009)	0.63	mg/L	Ref. 18, pp. 17, 20
o Xylene	UNKNOWN, NA-26 (10/23/2009)	0.46	mg/L	Ref. 18, pp. 18, 20
Acetone	UNKNOWN, NA-26 (10/27/2009)	2.5 E	mg/L	Ref. 18, pp. 72, 76
Carbon Disulfide	UNKNOWN, NA-26 (10/27/2009)	0.029	mg/L	Ref. 18, pp. 72, 76
2-Butanone	UNKNOWN, NA-26 (10/27/2009)	0.30	mg/L	Ref. 18, pp. 72, 76
4-Methyl-2-pentanone (MIBK)	UNKNOWN, NA-26 (10/27/2009)	0.064	mg/L	Ref. 18, pp. 72, 76
m/p Xylene	UNKNOWN, NA-26 (10/27/2009)	0.090	mg/L	Ref. 18, pp. 72, 76
o Xylene	UNKNOWN, NA-26 (10/27/2009)	0.052D	mg/L	Ref. 18, pp. 73, 76
Acetone	20126-01 24” LINE BREAKS	6.99	mg/L	Ref. 18, pp. 91, 97
Benzene	20126-01 24” LINE BREAKS	0.0245	mg/L	Ref. 18, pp. 91, 97
Carbon disulfide	20126-01 24” LINE BREAKS	0.0299	mg/L	Ref. 18, pp. 91, 97
1,2-Dichloroethane	20126-01 24” LINE BREAKS	0.0095	mg/L	Ref. 18, pp. 91, 97
Ethylbenzene	20126-01 24” LINE BREAKS	0.0252	mg/L	Ref. 18, pp. 91, 97
Methyl ethyl ketone	20126-01 24” LINE BREAKS	0.303	mg/L	Ref. 18, pp. 91, 97
Tetrachloroethylene	20126-01 24” LINE BREAKS	0.0065	mg/L	Ref. 18, pp. 91, 97
Toluene	20126-01 24” LINE BREAKS	0.0231	mg/L	Ref. 18, pp. 91, 97
Trichloroethylene	20126-01 24” LINE BREAKS	0.0054	mg/L	Ref. 18, pp. 91, 97
Xylene (total)	20126-01 24” LINE BREAKS	0.129	mg/L	Ref. 18, pp. 92, 97
Benzoic Acid	20126-01 24” LINE BREAKS	1.03	mg/L	Ref. 18, pp. 93, 97

Hazardous Substance	Evidence			References
	Sample ID[1]	Concentration	Units	
2-Methylphenol	20126-01 24" LINE BREAKS	0.0864	mg/L	Ref. 18, pp. 93, 97
3&4-Methylphenol	20126-01 24" LINE BREAKS	0.196	mg/L	Ref. 18, pp. 93, 97
Phenol	20126-01 24" LINE BREAKS	0.692	mg/L	Ref. 18, pp. 93, 97
Acenaphthene	20126-01 24" LINE BREAKS	0.0036 J ÷ 4.68 = 0.00076	mg/L	Ref. 18, pp. 93, 97
Butyl benzyl phthalate	20126-01 24" LINE BREAKS	0.0037 J ÷ 10 = 0.00037	mg/L	Ref. 18, pp. 93, 97
Chrysene	20126-01 24" LINE BREAKS	0.001 J ÷ 10 = 0.0001	mg/L	Ref. 18, pp. 93, 97
Di-n-butyl phthalate	20126-01 24" LINE BREAKS	0.0032 J ÷ 10 = 0.00032	mg/L	Ref. 18, pp. 94, 97
Bis(2-Ethylhexyl)phthalate	20126-01 24" LINE BREAKS	0.0077	mg/L	Ref. 18, pp. 94, 97
Fluorene	20126-01 24" LINE BREAKS	0.0026 J ÷ 10 = 0.00026	mg/L	Ref. 18, pp. 94, 97
2-Methylnaphthalene	20126-01 24" LINE BREAKS	0.0319	mg/L	Ref. 18, pp. 94, 97
Naphthalene	20126-01 24" LINE BREAKS	0.0341	mg/L	Ref. 18, pp. 94, 97
Phenanthrene	20126-01 24" LINE BREAKS	0.0043 J ÷ 10 = 0.00043	mg/L	Ref. 18, pp. 94, 97
Pyrene	20126-01 24" LINE BREAKS	0.0029 J ÷ 11.86 = 0.00024	mg/L	Ref. 18, pp. 94, 97
MCC Tank Samples				
Acetone	East Digester	0.51 E	mg/L	Ref. 18, pp. 31, 35
Carbon Disulfide	East Digester	0.032	mg/L	Ref. 18, pp. 31, 35
Methyl acetate	East Digester	0.020	mg/L	Ref. 18, pp. 31, 35
2-Butanone	East Digester	0.20 E	mg/L	Ref. 18, pp. 31, 35
4-Methyl-2-pentanone (MIBK)	East Digester	0.018	mg/L	Ref. 18, pp. 31, 35
Acetone	East Clarifier	3.6 ED	mg/L	Ref. 18, pp. 39, 43
Carbon Disulfide	East Clarifier	0.068	mg/L	Ref. 18, pp. 39, 43
Methyl acetate	East Clarifier	0.048	mg/L	Ref. 18, pp. 39, 43
2-Butanone	East Clarifier	0.43	mg/L	Ref. 18, pp. 39, 43
4-Methyl-2-pentanone (MIBK)	East Clarifier	0.030 J	mg/L	Ref. 18, pp. 39, 43
Acetone	West Clarifier	1.5	mg/L	Ref. 18, pp. 47, 51
Carbon Disulfide	West Clarifier	0.25	mg/L	Ref. 18, pp. 47, 51
Methyl acetate	West Clarifier	0.030	mg/L	Ref. 18, pp. 47, 51
2-Butanone	West Clarifier	0.210	mg/L	Ref. 18, pp. 47, 51

Hazardous Substance	Evidence			References
	Sample ID[1]	Concentration	Units	
Acetone	West Digester	0.48	mg/L	Ref. 18, pp. 55, 59
Carbon Disulfide	West Digester	0.07	mg/L	Ref. 18, pp. 55, 59
Methyl acetate	West Digester	0.051	mg/L	Ref. 18, pp. 55, 59
2-Butanone	West Digester	0.420	mg/L	Ref. 18, pp. 55, 59
Acetone	Lift Station	6.5 ED	mg/L	Ref. 18, pp. 79, 83
Carbon Disulfide	Lift Station	0.039	mg/L	Ref. 18, pp. 79, 83
Methyl acetate	Lift Station	0.083	mg/L	Ref. 18, pp. 79, 83
2-Butanone	Lift Station	0.86 ED	mg/L	Ref. 18, pp. 79, 83
Benzene	Lift Station	0.028	mg/L	Ref. 18, pp. 79, 83
4-Methyl-2-pentanone (MIBK)	Lift Station	0.130	mg/L	Ref. 18, pp. 79, 83
Ethylbenzene	Lift Station	0.031	mg/L	Ref. 18, pp. 79, 83
m/p Xylene	Lift Station	0.110	mg/L	Ref. 18, pp. 79, 83
o Xylene	Lift Station	0.061	mg/L	Ref. 18, pp. 80, 83

Note:
J = Indicates estimated value (Ref. 18, p. 92).
RL = Reporting Limit (Ref. 18, p. 92).
[1] = The Lab Sample ID name is identified as "UNKNOWN, NA 26" in reference 18.

In January 2010, an investigator with the TCEQ Water Quality Pretreatment Program observed unpermitted discharges into Vince Bayou from the USOR property (Ref. 6, p. 18). A violation was issued due to failure to prevent the unauthorized discharge of wastewater into the waters of the State. Wastewater was discharging from the old chlorine contact tank to Vince Bayou from two unpermitted outfalls. Two separate discharges were observed from the two outfall pipes located downstream of an old chlorine contact chamber. The two old outfall pipes are adjacent to each other; both pipes are located at the east plant of the MCC property and both pipes discharge to Vince Bayou (Ref. 6, p. 18; Ref. 12, p. 25; Ref. 54). The wastewater discharging into the bayou was sampled on 8 January 2010 (labeled Discharge to Bayou) and 13 January 2010 (44028-01 and -02) (Ref. 12, p. 21). Analytical results indicated that acetone, arsenic, manganese, mercury and zinc was present in the discharge as shown in the table below (Ref. 6, pp. 18, 664-665; Ref. 12, pp. 24, 25, 27, 28, 29, 35-37, 49, 53, 54, 64-68).

Hazardous Substance	Evidence			References
	Sample ID	Concentration	Units	
TCEQ Investigation – January 2010				
Arsenic	Discharge to Bayou	0.023	mg/L	Ref. 12, pp. 28, 29
Manganese	Discharge to Bayou	0.346	mg/L	Ref. 12, pp. 28, 29
Mercury	Discharge to Bayou	0.001	mg/L	Ref. 12, pp. 28, 29
Zinc	Discharge to Bayou	1.59	mg/L	Ref. 12, pp. 28, 29
Acetone	Discharge to Bayou	15.5	mg/L	Ref. 12, pp. 36, 39
Acetone	44028-01	2.5	mg/L	Ref. 12, pp. 49, 52, 53
Acetone	44028-02	0.843	mg/L	Ref. 12, pp. 52, 54

During EPA ER activities in July 2010, sources overflowing into the floodwater were observed. EPA and TCEQ observed an uncontrolled release of liquids from the containment pond, secondary containments, and roll-off boxes labeled as containing hazardous waste, as well as from the surface impoundments located at the 200 N. Richey property (Ref. 7, pp. 3, 6). On 2 July 2010, the site received approximately 7 to 12 inches of rain. At one point during the day, North Richey Street directly in front of the site access was covered by over 4 feet of water, and Vince Bayou has raised to within 15 feet of the property fence line (Ref. 7, p. 3). The roll-off boxes labeled "Hazardous Waste" were observed leaking and the hazardous waste was in direct contact with the storm water which flowed down the main driveway of the USOR property, flowing across Richey St. and entering Vince Bayou (Ref. 6, pp. 64, 65, 111). The roll-off boxes were known to contain hazardous waste since they were sampled 16 October 2009 (RB-0325226 and RB-0325215) (Ref. 8, p. 5). Sampling results were received from Accutest Laboratories on 30 October 2009. The sample results showed the roll-off boxes were hazardous for benzene (D018) and 1,2-dichloroethane (D028) as shown in the table below (Ref. 8, pp. 6, 176, 180, 195). Floodwater during EPA ER activities in July 2010 documented flooding of the USOR site and direct contact of the sources located on the property with the floodwaters entering Vince Bayou (Ref. 6, pp. 64-67, 108-114, 116-127).

Hazardous Substance	Evidence				References
	Sample ID	Concentration	RL	Units	
TCEQ Investigation – January 2010					
Benzene	RB-0325226	0.624	0.13	mg/L	Ref. 8, pp. 176, 195
1,2-Dichloroethane	RB-0325226	0.835	0.13	mg/L	Ref. 8, pp. 176, 195
Benzene	RB-0325215	1.16	0.13	mg/L	Ref. 8, pp. 180, 195
1,2-Dichloroethane	RB-0325215	0.778	0.13	mg/L	Ref. 8, pp. 180, 195

Note:
These concentrations were reported from the TCLP Leachate of the sample.

In addition to the events above, in December 2009, EPA inspectors observed the stormwater basin overflowing with an oily sheen and discharging into Vince Bayou (Ref. 9. p. 16). On 14 December, 2009, EPA inspectors observed a waste delivery truck leaking D001 (characteristic hazardous waste for ignitibility) hazardous waste from a discharge valve into the stormwater basin or containment pond (Ref. 5, p. 288; Ref. 9, p. 16).

Chemical Analysis

Surface water and sediment samples were collected during the March 2011 supplemental sampling activities conducted by EPA START-3 (Ref. 44, p. 4). A total of 21 surface water and sediment samples were collected from the surface water pathway at 19 locations within Vince and Little Vince Bayous. The 21 samples includes 2 duplicate samples collected from the same location as the parent sample. In addition, to demonstrate overland flow and migration of contamination from on-site sources, seven soil samples were collected along the overland flow pathways (Ref. 28, p. 6; Ref. 29, p. 12, 14 20; Ref. 44, p. 4). Sample locations are depicted in Figure A-5 of Attachment A.

Background Concentrations:

Background surface water and sediment samples were collected from the locations described below to investigate whether a release from the site could be established (Ref. 44, p. 4).

- **Vince Bayou -** A background surface water and sediment sample was collected from Vince Bayou (BG-02) immediately upgradient of the property at 200 N. Richey Street (Attachment A, Figure A-5; Ref. 28, p. 70). The background surface water and sediment sample collected from Vince Bayou will be compared to site-related surface water and samples collected from Vince Bayou.

- **Little Vince Bayou –** A background surface water and sediment sample was collected within Little Vince Bayou (BG-01) immediately upgradient of its confluence with Vince Bayou ((Attachment A, Figure A-5; Ref. 28, p. 72). The background surface water and sediment sample collected from Little Vince Bayou will be compared to site-related surface water and sediment samples collected from Vince Bayou downstream of the Little Vince Bayou and Vince Bayou confluence.

The background surface water and sediment samples were collected on 01 and 03 March 2011 by EPA START-3. The surface water samples were collected from shallow depths by submerging the sample container into the water. The mouth of the sample container was positioned so that it faced upstream, while the sampling personnel stood downstream so as not to stir up sediment that could potentially contaminate the sample. The sediment samples were collected with disposable plastic scoops and homogenized in plastic bags. The homogenized sample was then transferred to an 8-ounce sample container. The samples were collected from 0 to 1 inch from below ground surface from locations within the bayou where sediments had accumulated such as bends in the bayou (Ref. 29, pp. 99, 101-103; Ref. 44, p. 4). Once collected, both surface water and sediment sample bottles were placed on ice until shipping (Ref. 29, pp. 17, 22, 49; Ref. 44, p. 5).The background samples (surface water and sediment) and the samples collected to demonstrate the presence of contamination in the overland flow path and to demonstrate an observed release were all collected during the same time frame during the same sampling event (Ref. 44, p. 4). The samples were collected by the same field team during the same sampling event, following the same sample collection protocols and methodologies. Background samples were collected from similar locations, were from similar media, same depth, used the same sampling methods, preservation, and handling and were all collected during the same weather conditions as the observed release samples (Ref. 28, pp. 68-75; Ref. 29; Ref. 44, pp. 1-5).

Sediment samples for organic analysis were hand delivered to the EPA Region 6 Environmental Services Branch Laboratory for analysis of VOCs and SVOCs. Surface water samples for organic analysis were shipped via Federal Express to the Datachem laboratory located in Salt Lake City, Utah, for VOC and SVOC analysis under the Contract Laboratory Program (CLP). Surface water and sediment samples for inorganic analysis were shipped via Federal Express to the Sentinel laboratory located in Huntsville, Alabama for metals analysis under the CLP The samples were analyzed for VOCs and SVOCs by CLP OLM04.2 and for TAL metals and mercury by CLP ISM01.2 (Ref. 24, pp. 320-327; Ref. 29, p. 19; Ref. 30, p. 68; Ref. 38, p. 16; Ref. 39, p. 35).

EPA Supplemental Sampling Event - Background Sample Descriptions
March 2011

Station Location (Sample ID.)	Sample Location	Sample Date (Military Time)	Reference
Surface Water			
BG-02 (F3SD9/MF3SD9)	Vince Bayou upgradient of USOR property at 200 N. Richey Street (south of W. Richey Street)	03/02/2011 (1112)	Ref. 30, pp. 47, 49; Ref. 28, p. 68; Ref. 44, p. 4;Attachment A, Figure A-5
BG-01 (F3SJ6/MF3SJ6)	Little Vince Bayou upgradient of its confluence with Vince Bayou	03/03/2011 (1330)	Ref. 38, p. 16; Ref. 28, p. 72: Ref. 44, p. 4; Attachment A, Figure A-5
Sediment			
BG-02 (BG-02-03-51/MF3SF3)	Vince Bayou upgradient of USOR property at 200 N. Richey Street (south of W. Richey Street)	03/02/2011 (1050)	Ref. 24, p. 322; Ref. 28, p. 68; Ref. 40, p. 27; Ref. 44, p. 4;Attachment A, Figure A-5
BG-01 (BG-01-03-51/MF3SJ5)	Little Vince Bayou upgradient of its confluence with Vince Bayou	03/03/2011 (1330)	Ref. 24, p.324; Ref. 28, p. 72: Ref. 41, p. 18; Ref. 44, p. 4; Attachment A, Figure A-5

EPA Supplemental Sampling Event - Background Sample Concentrations March 2011

Summary of USOR Designated Background Levels				
Hazardous Substance	**Evidence**			**Reference**
	Station Location/ Sample ID	**Concentration**	**RL and CRQL** [1]	
Surface Water – Vince Bayou, BG-02		**mg/L**	**mg/L**	
Arsenic	MF3SD9	0.0149 J+	0.001	Ref. 42, pp. 5 13, 25, 38
Barium	MF3SD9	0.0728	0.01	Ref. 42, pp. 5 13, 25, 38
Lead	MF3SD9	0.0016 J+	0.001	Ref. 42, pp. 5 13, 25, 38
Manganese	MF3SD9	0.0426	0.001	Ref. 42, pp. 5, 13, 25, 38
Nickel	MF3SD9	0.0039	0.001	Ref. 42, pp. 5 13, 25, 38
Silver	MF3SD9	0.0017 J+	0.001	Ref. 42, pp. 5 13, 25, 38
Zinc	MF3SD9	0.0141 J- (0.018189)[2]	0.002	Ref. 21, pp. 8, 18; Ref. 42, pp. 5, 13, 25, 38
Surface Water – Little Vince Bayou, BG-01		**mg/L**	**mg/L**	
Chloroform	F3SJ6	0.00057	0.0005	Ref. 39, pp. 19, 35, 105
Arsenic	MF3SJ6	0.021 J	0.002	Ref. 38, pp. 13,16, 32
Barium	MF3SJ6	0.0582 J	0.010	Ref. 38, pp. 13,16, 32
Manganese	MF3SJ6	0.0352	0.002	Ref. 38, pp. 13,16, 32
Zinc	MF3SJ6	0.0201 J	0.004	Ref. 38, pp. 13,16, 32
Sediment – Vince Bayou, BG-02		**mg/kg**	**mg/kg**	
Benzo(a)anthracene	BG-02-03-51	1.16	0.694	Ref. 24, pp. 75, 322
Benzo(a)pyrene	BG-02-03-51	1.74	0.694	Ref. 24, pp. 75, 322
Benzo(b)fluoranthene	BG-02-03-51	1.9	0.694	Ref. 24, pp. 75, 322
Benzo(g,h,i)perylene	BG-02-03-51	1.37	0.694	Ref. 24, pp. 75, 322
Benzo(k)fluoranthene	BG-02-03-51	1.39	0.694	Ref. 24, pp. 75, 322
Bis(2-ethylhexyl)phthalate	BG-02-03-51	0.694 U	0.694	Ref. 24, pp. 75, 322
Chrysene	BG-02-03-51	1.75	0.694	Ref. 24, pp. 76, 322
Fluoranthene	BG-02-03-51	2.53	0.278	Ref. 24, pp. 76, 322
Indeno(1,2,3-cd)pyrene	BG-02-03-51	1.16	0.694	Ref. 24, pp. 76, 322
2-Methylnaphthalene	BG-02-03-51	0.278 U	0.278	Ref. 24, pp. 76, 322
Naphthalene	BG-02-03-51	0.278 U	0.278	Ref. 24, pp. 76, 322
Phenanthrene	BG-02-03-51	0.750	0.278	Ref. 24, pp. 77, 322
Pyrene	BG-02-03-51	2.74	0.278	Ref. 24, pp. 77, 322
Arsenic	MF3SF3	2.3 J	0.70	Ref. 40, pp. 8, 17, 27, 60
Barium	MF3SF3	81.0	7.0	Ref. 40, pp. 8, 17, 27, 60
Chromium	MF3SF3	16.2 J	1.4	Ref. 40, pp. 8, 17, 27, 60
Cobalt	MF3SF3	4.3 J	0.70	Ref. 40, pp. 8, 17, 27, 60
Copper	MF3SF3	16.7 J	1.4	Ref. 40, pp. 8, 17, 27, 60
Lead	MF3SF3	50.5 J	0.70	Ref. 40, pp. 8, 17, 27, 60
Manganese	MF3SF3	158 J	0.70	Ref. 40, pp. 8, 17, 27, 60
Mercury	MF3SF3	0.076 LJ	0.14	Ref. 40, pp. 8, 17, 27, 59
Silver	MF3SF3	0.70 U	0.70	Ref. 40, pp. 8, 17, 27, 60
Nickel	MF3SF3	7.8 J	0.70	Ref. 40, pp. 8, 17, 27, 60
Vanadium	MF3SF3	16.1 J	3.5	Ref. 40, pp. 8, 17, 27, 60
Zinc	MF3SF3	74.0 J- (111)[2]	1.4	Ref. 21, pp. 8, 18; Ref. 40, pp. 8, 17, 27, 60

Summary of USOR Designated Background Levels				
Hazardous Substance	**Evidence**			**Reference**
	Station Location/ Sample ID	**Concentration**	**RL and CRQL [1]**	
Sediment – Little Vince Bayou, BG-01		**mg/kg**	**mg/kg**	
Bis(2-ethylhexyl)phthalate	BG-01-03-51	0.629 U	0.629	Ref. 24, pp. 120, 324
2-Methylnaphthalene	BG-01-03-51	0.252 U	0.252	Ref. 24, pp. 121, 324
Naphthalene	BG-01-03-51	0.252 U	0.252	Ref. 24, pp. 121, 324
Arsenic	MF3SJ5	2.3 J	0.65	Ref. 41, pp. 3-11, 14, 18,45
Barium	MF3SJ5	196	6.5	Ref. 41, pp. 3-11, 14, 18,45
Beryllium	MF3SJ5	0.81 J	0.65	Ref. 41, pp. 3-11, 14, 18,45
Chromium	MF3SJ5	12.4	1.3	Ref. 41, pp. 3-11, 14, 18,45
Cobalt	MF3SJ5	4.3 J	0.65	Ref. 41, pp. 3-11, 14, 18,45
Copper	MF3SJ5	5.9 J	1.3	Ref. 41, pp. 3-11, 14, 18,45
Lead	MF3SJ5	10.3	0.65	Ref. 41, pp. 3-11, 14, 18,45
Manganese	MF3SJ5	148 J	0.65	Ref. 41, pp. 3-11, 14, 18,45
Mercury	MF3SJ5	0.0083 LJ	0.13	Ref. 41, pp. 3-11, 14, 18,44
Silver	MF3SJ5	0.65 U	0.65	Ref. 41, pp. 3-11, 14, 18,44
Nickel	MF3SJ5	9.5 J	0.65	Ref. 41, pp. 3-11, 14, 18,45
Vanadium	MF3SJ5	20.1 J	3.3	Ref. 41, pp. 3-11, 14, 18,45
Zinc	MF3SJ5	16.9 J	1.3	Ref. 41, pp. 3-11, 14, 18,45

Notes:

[1] The Reporting Limit (RL) terminology used by the EPA Region 6 Laboratory and the Adjusted Contract Required Quantitation Limit (CRQL) terminology used by the CLP Laboratory are both detection limits which have been adjusted for sample aliquot, sample volume, and dilutions for the analysis and meet the HRS definition of SQL (Ref. 1, Section 1.1, Table 2-3; Ref. 24, p. 4; Ref. 26).

[2] Values that have been adjusted according to the EPA Fact Sheet (Reference 21) are listed in parentheses.

U Not detected at reported quatitation limit (Ref. 42, p. 12).

J Result is estimated because of outlying quality control parameters or the result is below the CRQL (Ref. 38, p. 11, Ref. 40, p. 11, Ref. 41, p. 11, Ref. 42, p. 12).

L Reported concentration between the MDL and the CRQL (Ref. 38, p. 11, Ref. 40, p. 11, Ref. 41, p. 11, Ref. 42, p. 12).

\- Low biased (Ref. 38, p. 11, Ref. 40, p. 11, Ref. 41, p. 11, Ref. 42, p. 12).

\+ High biased (Ref. 38, p. 11, Ref. 40, p. 11, Ref. 41, p. 11, Ref. 42, p. 12).

Samples collected from Vince Bayou above and below the confluence of Little Vince Bayou will be compared against the highest designated background levels as shown below:

Surface Water Body	**Matrix**	**Hazardous Substance**	**Highest Background Concentration**	**Background Comparison Conc. 3 x Background or RL/CRQL**
Vince Bayou	Surface Water	Arsenic	0.0149 mg/L	0.0447 mg/L
		Barium	0.0728 mg/L	0.2184 mg/L
		Iron	0.160 J mg/L	0.20 mg/L
		Lead	0.0016 mg/L	0.0048 mg/L
		Manganese	0.0426 mg/L	0.1278 mg/L
		Nickel	0.0039 mg/L	0.0117 mg/L
		Silver	0.0017 mg/L	0.0051 mg/L
		Zinc	0.018189 mg/L	0.054567 mg/L
Little Vince Bayou	Surface Water	Chloroform	0.00057 mg/L	0.00171 mg/L
		Arsenic	0.021 J mg/L	0.063 mg/L
		Barium	0.0582 J mg/L	0.1746 mg/L
		Manganese	0.0352 mg/L	0.1056 mg/L
		Zinc	0.0201 J mg/L	0.0603 mg/L
Vince Bayou	Sediment	Benzo(a)anthracene	1.16 mg/kg	3.48 mg/kg
		Benzo(a)pyrene	1.74 mg/kg	5.22 mg/kg
		Benzi(b)fluoranthene	1.9 mg/kg	5.7 mg/kg
		Benzo(g,h,i)perylene	1.37 mg/kg	4.11 mg/kg
		Benzo(k)fluoranthene	1.39 mg/kg	4.17 mg/kg
		Bis(2-ethylhexyl)phthalale	0.694 U mg/kg	0.0694 mg/kg
		Chrysene	1.75 mg/kg	5.25 mg/kg
		Fluoranthene	2.53 mg/kg	7.59 mg/kg
		Indeno(1,2,3-cd)pyrene	1.16 mg/kg	3.48 mg/kg
		2-Methylnaphthalene	0.278 U mg/kg	0.278 mg/kg
		Naphthalene	0.278 U mg/kg	0.278 mg/kg
		Phenanthrene	0.75 mg/kg	2.25 mg/kg
		Pyrene	2.74 mg/kg	8.22 mg/kg
		Arsenic	2.3 mg/kg	6.9 mg/kg
		Barium	81 mg/kg	243 mg/kg
		Chromium	16.2 mg/kg	448.6 mg/kg
		Cobalt	4.3 mg/kg	12.9 mg/kg
		Copper	16.7 mg/kg	50.1 mg/kg
		Iron	12,600 mg/kg	37,800 mg/kg
		Lead	50.5 mg/kg	151.5 mg/kg
		Manganese	158 mg/kg	474 mg/kg
		Mercury	0.076 J mg/kg	.228 mg/kg
		Silver	0.70 U mg/kg	0.70 mg/kg
		Nickel	7.8 mg/kg	23.4 mg/kg
		Vanadium	16.1 mg/kg	48.3 mg/kg
		Zinc	111 mg/kg	333 mg/kg

Surface Water Body	Matrix	Hazardous Substance	Highest Background Concentration	Background Comparison Conc. 3 x Background or RL/CRQL
Little Vince Bayou	Sediment	Bis(2-ethylhexyl)phthalate	0.629 U mg/kg	0.629 mg/kg
		2-Methylnaphthalene	0.252 U mg/kg	0.252 mg/kg
		Naphthalene	0.252 U mg/kg	0.252 mg/kg
		Arsenic	2.3 mg/kg	6.9 mg/kg
		Barium	196 mg/kg	588 mg/kg
		Beryllium	0.81 mg/kg	2.43 mg/kg
		Chromium	12.4 mg/kg	37.2 mg/kg
		Cobalt	4.3 mg/kg	12.9 mg/kg
		Copper	5.9 mg/kg	17.7 mg/kg
		Iron	15,200 mg/kg	45,600 mg/kg
		Lead	10.3 mg/kg	30.9 mg/kg
		Manganese	148 mg/kg	444 mg/kg
		Mercury	0.0083 LJ mg/kg	0.13 mg/kg
		Nickel	9.5 mg/kg	28.5 mg/kg
		Silver	0.65 U mg/kg	0.65 mg/kg
		Vanadium	20.1 mg/kg	60.3 mg/kg
		Zinc	16.9 mg/kg	50.7 mg/kg

Notes:
U Not detected at reported quatitation limit (Ref. 42, p. 12).
J Result is estimated because of outlying quality control parameters (Ref. 42, p. 12).
L Reported concentration between the MDL and the CRQL (Ref. 42, p. 12).

Observed Release Samples:

Samples identified as "contaminated" are those that meet observed release criteria as defined by the HRS (Ref. 1, Table 2-3). Observed release criteria is met when the hazardous substance is attributable to a release from the site, its concentration exceeds the SQL(including the background SQL), and is at least three times greater than the background concentration when the background concentration equals or exceeds its SQL (Ref. 1, Table 2-3). Sampling locations with hazardous substances meeting observed release criteria are presented below.

EPA Supplemental Sampling Event – March 2011

Station Location (Sample ID)	Sample Location	Sample Date (Military Time)	Reference
Vince Bayou			
SW-01 (SED-01-03-51)	Furthest downstream sample located in Vince Bayou, 190 feet downstream of PPE-01	03/02/2011 (1537)	Ref. 24, p. 323; Ref. 28, p. 71; Ref. 34
SW-02 (MF3SG4)	90 feet downstream of PPE-01 in Vince Bayou	03/02/2011 (1600)	Ref. 28, p. 71;Ref. 34; Ref. 40, p. 25
PPE-01 (MF3SH3/MF3SH2)	Furthest downstream PPE into Vince Bayou from northern end of 400 N. Richey Street property	03/03/2011 (0927/0929)	Ref. 28, p. 72;Ref. 34; Ref. 41, pp. 17, 18
SW-03 (MF3SH5/MF3SH4)	150 feet upgradient from PPE-01 and 440 feet downstream of PPE-02 in Vince Bayou	03/03/2011 (0950/0954	Ref. 28, p. 72;Ref. 34; Ref. 42, pp. 29, 30
SW-04 (MF3SH7/MF3SH6)	340 feet upgradient from PPE-01and 250 feet downstream of PPE-02 in Vince Bayou	03/03/2011 (0927/0929)	Ref. 28, p. 72;Ref. 34; Ref. 41, pp. 17, 18;
PPE-02 (MF3SH9)	PPE from northeast corner of 400 N. Richey Street property into Vince Bayou	03/03/2011 (1037)	Ref. 28, p. 72;Ref. 34; Ref. 41, p. 17
SW-07 (PPE-02A/MF3SG9)	PPE from drainage ditch along 400 N. Richey Street property into Vince Bayou	03/02/2011 (0839)	Ref. 28, p. 71;Ref. 34; Ref. 41, p. 18
PPE-03 MF3SG0/PPE-03-03-51/MF3SG1)	PPE from entrance drive of 400 N. Richey Street property into Vince Bayou	03/02/2011 (1442/1447)	Ref. 24, p. 323; Ref. 28, p. 70;Ref. 34; Ref. 40 , p. 25
SW-08 (MF3SJ0)	215feet upgradient from PPE-03 and 150 feet downstream of PPE-04 in Vince Bayou	03/03/2011 (1122)	Ref. 28, p. 72;Ref. 34; Ref. 41, p. 17
PPE-04 (MF3SF8/PPE-04-03-51)	PPE from southeastern edge of 400 N. Richey Street property into Vince Bayou	03/02/2011 (1407/1412)	Ref. 24, p. 323; Ref. 28, p. 70;Ref. 34; Ref.42, p. 28
SW-09 (MF3SF7/MF3SF6)	125 feet upgradient from PPE-04 and 330 feet downstream of PPE-05 in Vince Bayou	03/02/2011 (1344/1350)	Ref. 28, p. 70;Ref. 34; Ref. 40, p. 27
PPE-05 (MF3SE3/MF3SE4/PPE-05-03-51)	PPE from eastern side of 200 N. Richey Street property into Vince Bayou	03/01&02/2011 (1442/0937)	Ref. 24, p. 322; Ref. 28, pp. 69, 70;Ref. 34; Ref. 42, p. 26
SW-10 (MF3SE6/MF3SE7/MF3SE8)	385 feet upgradient from PPE-04 and 70 feet downstream of PPE-05 in Vince Bayou	03/02/2011 (1305/0845)	Ref. 28, p. 70;Ref. 34; Ref. 42, p. 26
PPE-06 (MF3SE1/PPE-06-03-51)	PPE from western side of N. Richey Street property into Vince Bayou	03/01&02/2011 1325/1006)	Ref. 24, p. 322; Ref. 28, pp. 69, 70;Ref. 34; Ref. 42, p. 26
SW-11 (PPE-06A) (MF3SE0/SED-11-3-51)	Furthest upgradient PPE from southern end of 20(N. Richey Street property	03/01&02/2011 (1305/1107)	Ref. 24, p. 322; Ref. 28, pp. 69, 70;Ref. 34; Ref. 42, p. 26

The surface water and sediment samples were collected on 01 and 03 March 2011 by EPA START-3. The surface water samples were collected from shallow depths by submerging the sample container into the water. The mouth of the sample container was positioned so that it faced upstream, while the sampling personnel stood downstream so as not to stir up sediment that could potentially contaminate the sample. The sediment samples were collected with disposable plastic scoops and homogenized in plastic bags. The homogenized sample was then transferred to an 8-ounce sample container. The samples were collected from 0 to 1 inch from below ground surface from locations within the bayou where sediments had accumulated such as bends in the bayou (Ref. 29, pp. 99, 101-103; Ref. 44, p. 4). Once collected, both surface water and sediment sample bottles were placed on ice until shipping (Ref. 29, pp. 17, 22, 49; Ref. 44, p. 5).

Sediment samples for organic analysis were hand delivered to the EPA Region 6 Environmental Services Branch Laboratory for analysis of VOCs and SVOCs. Surface water samples for organic analysis were shipped via Federal Express to the Datachem laboratory located in Salt Lake City, Utah, for VOC and SVOC analysis under the Contract Laboratory Program (CLP). Surface water and sediment samples for inorganic analysis were shipped via Federal Express to the Sentinel laboratory located in Huntsville, Alabama for metals analysis under the CLP. The samples were analyzed for VOCs and SVOCs by CLP OLM04.2 and for TAL metals and mercury by CLP ISM01.2 (; Ref. 38, p. 16; Ref. 24, pp. 320-327; Ref. 30, pp. 47-53; Ref. 39, pp. 34-37; Ref. 44, p. 5)

EPA Supplemental Sampling Event – March 2011
Surface Water Samples – Vince Bayou

Station Location (Sample ID)	Hazardous Substance	Concentration[2] mg/L	Adjusted CRQL[1] mg/L	Reference
SW-03 (MF3SH4)	Lead	0.016	0.001	Ref. 42, pp. 5 19, 30, 55

Notes:
[1] The Adjusted Contract Required Quantitation Limit (CRQL) terminology used by the CLP Laboratory is detection limits which have been adjusted for sample aliquot, sample volume, and dilutions for the analysis and meet the HRS definition of SQL (Ref. 1, Section 1.1,, Table 2-3; Ref. 24, p. 3; Ref. 26).

EPA Supplemental Sampling Event – March 2011
Sediment Samples – Vince Bayou

Station Location (Sample ID)	Hazardous Substance	Concentration mg/kg	Adjusted CRQL[1] mg/kg	Reference
SW-01 (SED-01-03-51)	Bis(2-ethylhexyl)phthalate	0.904 B	0.695	Ref. 24, pp. 80, 323
SW-01 (MF3SG2)	Arsenic	13.1 J	0.82	Ref. 40, pp. 8, 19, 25
SW-02 (MF3SG4)	Arsenic	11.8 J	0.68	Ref. 40, pp. 8, 19, 25, 74
	Mercury	0.92	0.14	Ref. 40, pp. 8, 19, 25, 73
SW-03 (MF3SH5)	Mercury	0.32	0.17	Ref. 41, pp. 8, 13, 18, 34
	Silver	1.7	0.87	Ref. 41, pp. 8, 13, 18, 35
SW-04 (MF3SH6)	Arsenic	19.3 J	0.67	Ref. 41, pp. 8, 13, 18, 37
	Mercury	1.8	0.13	Ref. 41, pp. 8, 13, 18, 36
SW-08 (MF3SJ0)	Barium	291	8.2	Ref. 41, pp. 8, 14, 17, 41
	Lead	196	1.6	Ref. 41, pp. 8, 14, 17, 41
	Mercury	0.81	0.16	Ref. 41, pp. 8, 14, 17, 40
	Silver	7.9	0.82	Ref. 41, pp. 8, 14, 17,41
SW-09 (MF3SF6)	Mercury	0.33	0.14	Ref. 40, pp. 8, 18, 27, 65
	Silver	1.8	0.69	Ref. 40, pp. 8, 18, 27, 66
SW-10 (MF3SE8)	Cobalt	26.7 J	3.4	Ref. 40, pp. 8, 15, 26, 52
	Manganese	1,030 J	3.4	Ref. 40, pp. 8, 15, 26, 52
	Vanadium	48.7 J	17	Ref. 40, pp. 8, 15, 26, 52
SW-11 (SED-11-03-51)	Bis (2-ethylhexyl)phthalate	0.563 B	0.550	Ref. 24, p. 105, 322
PPE-01 (MF3SH2)	Arsenic	10.3 J	0.67	Ref. 41, pp. 8, 12, 17, 33
	Mercury	0.35	0.13	Ref. 41, pp. 8, 12, 17, 32
	Silver	1.0	0.67	Ref. 41, pp. 8, 12, 17, 33
PPE-02 (MF3SH9)	Mercury	0.32	0.16	Ref. 41, pp. 8, 13, 17, 38
	Silver	2.3	0.79	Ref. 41, pp. 8, 13, 17, 39
PPE-03 (PPE-03-03-51)	Carbon disulfide	0.146 B	0.1	Ref. 24, pp. 48, 323
	Bis (2-ethylhexyl)phthalate	7.45	0.772	Ref. 24, pp. 50, 323
PPE-03 (MF3SG1)	Silver	1.1	0.85	Ref. 40, pp. 8, 18, 25, 70
PPE-04 (PPE-04-03-51)	Bis (2-ethylhexyl)phthalate	1.21	0.721	Ref. 24, pp. 55, 323
PPE-05 (PPE-05-03-51)	Bis (2-ethylhexyl)phthalate	1.88	1.01	Ref. 24, pp. 60, 322
	2-Methlynaphthalene	0.544	0.406	Ref. 24, pp. 61 ,322
	Naphthalene	0.416	0.406	Ref. 24, pp. 61, 322
PPE-05 field duplicate (PPE-05-03-52)	Bis (2-ethylhexyl)phthalate	1.97	0.776	Ref. 24, pp. 65, 322
PPE-06 (MF3SF5/ PPE-06-03-51)	Bis (2-ethylhexyl)phthalate	1.95	0.831	Ref. 24, pp. 70, 322

Notes:
[1] The Adjusted Contract Required Quantitation Limit (CRQL) terminology used by the CLP Laboratory is detection limits which have been adjusted for sample aliquot, sample volume, and dilutions for the analysis and meet the HRS definition of SQL (Ref. 1, Section 1.1, Table 2-3; Ref. 24, p. 3; Ref. 26).
B Blank related – the concentration found in the sample was less than 10x the concentration found in the associated extraction, digestion and/or analysis

blank (Ref. 24, p. 328).
J Result is estimated because of outlying quality control parameters (Ref. 40, p. 11, Ref. 41, p. 11).

Attribution:

Attribution generally involves demonstrating that the hazardous substances used to establish an observed release can be associated with the site, and the site contributed at least in part to the significant increase in the concentration of the hazardous substances. Although USOR and MCC Recycling were evaluated as separate sites in the TCEQ Preliminary Assessments (Ref. 5, pp. 10, 11; Ref, 6, pp. 10, 11), it has been demonstrated that these properties are one site since they are owned by the same individual, their operations are interconnected, they have similar waste sources including that waste from the 400 N. Richey Street property is transported to the 200 N. Richey Street property via a pipeline, and they affect the same pathway targets (Ref. 9, p. 3; Ref. 11, pp. 1, 2; Ref. 12, p. 5).

Association with Sources

Sources containing hazardous substances and releases of hazardous substances from these sources have been documented at this site, as discussed in Section 2.2 Source Characterization of this HRS documentation record and Section 4.1.2.1.1 Observed Release of the HRS. Samples collected from overland drainage routes document hazardous substance migration from site sources to the surface water pathway (Ref. 29, p. 14). The following soil samples are included to support migration of site-related contamination along the overland flow segments from the sources to the probable points of entry to Vince Bayou.

Station Location (CLP Sample No.)	Sampling Location	Sample Date (Military Time)	Reference
EPA Supplemental Sampling Event – March 2011			
SS-01 (MF3SD8)	North of the 400 N. Richey Street property between the property boundary and PPE-01 into Vince Bayou	03/01/2011 (1022)	Ref. 28, p. 68; Ref. 40, p. 24 ; Attachment A, Figure A-5
SS-02 (MF3SD7)	North of the 400 N. Richey Street property between the property boundary and PPE-01 into Vince Bayou	03/01/2011 (1012)	Ref. 28, p. 68; Ref. 40, p. 24; Attachment A, Figure A-5
SS-03 (MF3SD5)	Northeast corner of the 400 N. Richey Street property between the property boundary and PPE-02 into Vince Bayou	03/01/2011 (0948)	Ref. 28, p. 68; Ref. 40, p. 23; Attachment A, Figure A-5
SS-03 field duplicate (MF3SD6)	Northeast corner of the 400 N. Richey Street property between the property boundary and PPE-02 into Vince Bayou	03/01/2011 (0955)	Ref. 28, p. 68; Ref. 40, p. 23; Attachment A, Figure A-5
SS-04 (MF3SD4)	East side of the 400 N. Richey Street property between property boundary and PPE-03 into Vince Bayou	03/01/2011 (0925)	Ref. 28, p. 68; Ref. 40, p. 23; Attachment A, Figure A-5
SS-05 (MF3SD3)	Southeast side of the 400 N. Richey Street property between the property boundary and PPE-04 into Vince Bayou	03/01/2011 (0902)	Ref. 28, p. 68; Ref. 40, p. 23; Attachment A, Figure A-5
SS-06 (MF3SD1)	East side of western portion of 200 N. Richey Street property between the property boundary and PPE-06 into Vince Bayou	03/01/2011 (0833)	Ref. 28, p. 68; Ref. 40, p. 23 ; Attachment A, Figure A-5

Station Location (CLP Sample No.)	Sampling Location	Sample Date (Military Time)	Reference
SS-07 (MF3SD2)	West side of eastern portion of 200 N. Richey Street property between the property boundary and PPE-05 into Vince Bayou	03/01/2011 (0846)	Ref. 28, p. 68; Ref. 40, p. 23; Attachment A, Figure A-5

Analytical results from soil samples collected from overland flow pathways are included to support migration of site-related contamination at observed release concentrations along the overland flow segment from site source to the PPEs only. The analytical results from these samples were not used to score the site, but to support attribution.

Station Location (CLP Sample No.)	Hazardous Substance	Concentration[2] mg/kg	Adjusted CRQL[1] mg/kg	Reference
EPA Supplemental Sampling Event – March 2011				
SS-02 (MF3SD7)	Arsenic	11.9 J	1.3	Ref. 40, pp. 8, 15, 24, 48
SS-03 field duplicate (MF3SD6)	Arsenic	464 J	13	Ref. 40, pp. 8, 14, 23, 46
	Cobalt	57.7	13	Ref. 40, pp. 8, 14, 23, 46
	Manganese	3,600 J	13	Ref. 40, pp. 8, 14, 23, 46
	Mercury	0.16	0.13	Ref. 40, pp. 8, 14, 23, 45
	Nickel	30.9 J	13	Ref. 40, pp. 8, 14, 23, 46
	Vanadium	65.9 J	65	Ref. 40, pp. 8, 14, 23, 46
SS-03 (MF3SD5)	Arsenic	205 J	3.3	Ref. 40, pp. 8, 14, 23, 44
	Cobalt	19.1 J	3.3	Ref. 40, pp. 8, 14, 23, 44
	Manganese	1,170 J	3.3	Ref. 40, pp. 8, 14, 23, 44
	Mercury	0.15	0.13	Ref. 40, pp. 8, 14, 23, 43
SS-04 (MF3SD4)	Antimony	1.8 J	1.7	Ref. 40, pp. 8, 14, 23, 42
	Arsenic	10.5 J	0.83	Ref. 40, pp. 8, 14, 23, 42
SS-06 (MF3SD1)	Mercury	0.59	0.12	Ref. 40, pp. 8, 13, 23, 35
SS-07 (MF3SD2)	Mercury	0.66	0.12	Ref. 40, pp. 8, 13, 23, 37
	Silver	5.1	0.61	Ref. 40, pp. 8, 13, 23, 38

Notes:
1 The Adjusted Contract Required Quantitation Limit (CRQL) terminology used by the CLP Laboratory is detection limits which have been adjusted for sample aliquot, sample volume, and dilutions for the analysis and meet the HRS definition of SQL (Ref. 1, Section 1.1, Table 2-3; Ref. 24, p. 3; Ref. 26).
2 The qualification did not indicate bias and did not require use of an adjustment factor (Ref. 40, p. 11; Ref. 21)
J Result is estimated because of outlying quality control parameters or the result is below the CRQL (Ref 40, p. 11).

Results of attribution soil samples revealed detects of several metals as shown above. Of the metals detected above in attribution soil samples, arsenic, mercury, silver, cobalt, manganese, and vanadium were also detected within Vince Bayou at concentrations meeting observed release criteria (Ref. 1, Table 2-3). Due to historical operations at the site (operations that have demonstrated to cause arsenic, barium, cobalt, manganese, mercury, silver, and vanadium contamination as shown through sampling results of sources) combined with the overall lack of containment of the sources at the site and the fact that sediment samples of overland flow pathways meeting observed release criteria are present which support arsenic, cobalt, manganese, mercury, silver, and vanadium contamination migration from sources at the site into the surface water pathway, the arsenic, cobalt, manganese, mercury, silver, and vanadium contamination in sediments at the site can be attributed (wholly or, at least, in part) to the USOR site

Consideration of Other Possible Off-Site Sources

Although USOR is located in a highly industrialized area, the background samples collected at the site are deemed appropriate background samples for the purposes of evaluating the site under the EPA's HRS as the analytical results from the background samples are indicative of the highly industrialized area. Samples meeting observed release criteria, or displaying concentrations that are three times greater than the highest background concentration of a particular analyte, were collected at the site and from within the surface water pathway. Further, analytical results from samples collected from the sources at the site displayed the presence of the same contaminants as the samples from the surface water pathway meeting observed release criteria.

Downgradient sources were not evaluated as background. Although the surface water pathway includes water bodies which are tidally influenced there is no documentation to that there is tidal carry from other possible downgradient sources (Ref. 51, p. 1). The site is located approximately 18 stream miles from the coast and therefore only minimal elevation changes due to tidal influence are expected to occur (Ref. 3, pp. 1-3).

A search of the Toxic Release Inventory and EPA EnviroMapper databases were performed within the zip code of the site location. The facilities identified upgradient along Vince Bayou included: Macdermid a facility that contains glycol ethers, diethanolamine and ethylene glycol; JE Merit Constructors, Inc. and inactive paper facility; Corrosion Fighters an inactive facility with no compliance history; Houston Tape and Label an inactive facility which produced labels; Naylor Industrial Services an inactive general freight trucking company; and Exxon Company an inactive petroleum facility. No nearby facilities along the surface water pathway have shown a release of arsenic, cobalt, manganese, mercury, silver, and vanadium (Ref. 50; Ref. 53, pp.1-6).

Likelihood of Release Factor:

Based on the analytical data and attribution components listed above, arsenic, barium, cobalt, manganese, mercury, silver, and vanadium have been documented as the hazardous substances in the observed release to Vince Bayou. Therefore, the observed release factor value of 550 was assigned for Vince Bayou (Ref. 1, Section 4.1.2.1.1).

Likelihood of Release Factor Value: 550

4.3 POTENTIAL TO RELEASE

4.3.1 Potential to Release by Overland Flow

Potential to release was not evaluated because an observed release to surface water was established by direct observation and chemical analysis (see Section 4.1.2.1.1 of the HRS).

4.4 HUMAN FOOD CHAIN THREAT

WASTE CHARACTERISTICS

Evidence of contamination associated with Sources 1 through 8 has been established based on chemical analyses of samples collected from these sources (refer to the Attribution section and Section 2.2 for each source). Arsenic, barium, cobalt, manganese, mercury, silver, and vanadium were detected in sediment samples collected in Vince Bayou, thus establishing an observed release (see Section 4.1.2.1.1). The Vince Bayou has been documented to contain tidally influenced brackish water where the fishery and wetlands are located (Ref. 51, p. 1)

4.4.1 Toxicity/Persistence/Bioaccumulation

Hazardous Substance	Source Number	Toxicity Factor Value	Persistence Factor Value[1]	Bioaccumulation Value Fresh[2]	Bioaccumulation Value Salt[2]	Toxicity/ Persistence/ Bioaccumulation Factor Value	Reference
Arsenic	3,4,7,OR	10,000	1	5	500	5×10^6	Ref. 2, p.1
Bis(2-ethylhexyl) phthalate	2,4,6,OR	100	1	50,000	500	5×10^6	Ref. 2, p. 2
Cobalt	1,4,5,6,8, OR	10	1	5,000	5,000	5×10^4	Ref. 2, p. 3
Lead	3,4,5,6, OR	10,000	1	5	5,000	5×10^7	Ref. 2, p. 8
Manganese	1,2,4,5,6, 7,8, OR	10,000	1	50,000	50,000	5×10^8	Ref. 2, p. 8
Mercury	3,6,OR	10,000	1	50,000	50,000	5×10^8	Ref. 2, p. 8
2-Methyl-naphthalene	1,2,4,5,6, 8, OR	0	0.4000	50,000	50,000	0	Ref. 2, p. 9
Naphthalene	1,2,3,4,5, 6,8, OR	1,000	0.4000	50,000	5,000	2×10^7	Ref. 2, p. 9
Silver	3,4,OR	100	1	50	50,000	5×10^6	Ref. 2, p. 10
Vanadium	3,4,5,6, 7,OR	100	1	500	500	5×10^4	Ref. 2, p. 11

Notes:

OR – Observed Release

[1] The surface water category that includes rivers, oceans, coastal tidal waters, and great lakes was utilized to assign the hazardous substances persistence factor value (Ref. 1, Sect. 4.1.2.2.1.2). The persistence values were assigned for a river according to HRS Section 4.1.3.2.1.2.

[2] Bioaccumulation factor values are assigned from the SCDM (Ref. 2), for both water body types "Fresh Water" and “Salt Water” in which the fisheries are located. The data that yielded the higher factor value was assigned to the Bioaccumulation Factor Value of the hazardous substance (Ref. 1, Sect. 4.1.3.2.1.3).

Toxicity/Persistence/Bioaccumulation Factor Value: 5×10^8

4.4.2 Hazardous Waste Quantity

Source No.	Source Hazardous Waste Quantity Value	Containment			
		Ground Water	Surface Water	Gas	Air Particulate
1	33.896	NE	9	NE	NE
2	1,173.333	NE	10	NE	NE
3	48.889	NE	10	NE	NE
4	2,605.912	NE	10	NE	NE
5	48.216	NE	9	NE	NE
6	67.337	NE	10	NE	NE
7	1,813.333	NE	10	NE	NE
TOTAL	5,790.916				

A hazardous waste quantity of 5,790.916 is estimated for sources at the USOR site that when applied in HRS Table 2-6 yields a pathway hazardous waste quantity of 100. Also, as documented in section 4.7.2 of this HRS documentation record, a wetland is subject to Level II concentrations; therefore, a minimum value of 100 can be assigned for the hazardous waste quantity factor value (Ref. 1, Section 2.4.2.2).

Hazardous Waste Quantity Factor Value = 100

4.4.3 Waste Characteristics Factor Category Value

Toxicity/Persistence Factor Value: 10,000
Hazardous Waste Quantity Factor Value: 100
Bioaccumulation Potential Factor Value: 50,000

(Toxicity/Persistence Factor Value) x (Hazardous Waste Quantity Factor Value) = 1×10^6
(subject to a maximum of 1×10^8)

(Toxicity/Persistence Factor Value x Hazardous Waste Quantity Factor Value) x
(Bioaccumulation Potential Factor Value) = 5×10^{10}

A hazardous waste quantity factor of 100 is assigned according to HRS Section 2.4.2.2. From Reference 2 and Table 4-12 of the HRS, manganese and mercury have a toxicity/persistence value of 10,000 and a bioaccumulation potential factor of 50,000. The waste characteristics factor category value from Reference 1, Table 2-7 for a waste characteristics product of 5×10^{10} is 320.

Hazardous Waste Quantity Assigned Value: 100

Waste Characteristics Factor Category Value: 320

4.5 TARGETS

Level II concentrations in the surface water pathway can be established based on sediment samples that meet the criteria for an observed release and the hazardous substance has a bioaccumulation potential factor value greater or equal to 500 (Ref. 1, Sec. 4.1.3.3). As noted in Sections 4.1.2.1.1 of the HRS and 4.2.1 of this HRS documentation record, an observed release of hazardous substances having a bioaccumulation factor value of 500 or greater is documented in Vince Bayou. A human food chain fishery is present in Vince Bayou at the N. Richey St. bridge within the TDL (Ref. 6, p. 105; Ref. 17, pp. 1-2; Figure A-3). Level II concentrations of arsenic, cobalt, manganese, mercury, silver, and vanadium have been documented in sediments within the surface water flow path from PPE-06A to a distance of 2,475 feet downstream at sample location SW-01 (Ref. 34, pp. 1-2). The area from the farthest downstream Level II sample location (SW-01) to the 15-mile TDL is subject to potential contamination (refer to Figures A-4 and A-5).

EPA Supplemental Sampling Event – March 2011
Samples Meeting Observed Release Criteria

Station Location (Sample IDs)	Distance from furthest upgradient PPE (Feet) (Ref. 34)	Hazardous Substance	Bioaccumulation Potential Factor Value (Ref. 2)
PPE-05 (MF3SF5//PPE-05-03-51)	290	2-Methylnaphthalene Naphthalene	50,000 50,000
SW-10 (MF3SE6/MF3SE7/MF3SE8)	360	Cobalt Manganese Vanadium	5×10^4 5×10^8 5×10^4
SW-09 (MF3SF7/MF3SF6)	620	Mercury Silver	5×10^8 5,000
SW-08 (MF3SJ0)	895	Barium Lead Mercury Silver	5×10^6 5 5×10^8 5,000
PPE-03 (MF3SG0/PPE-03-03-51/MF3SG1)	1,110	Bis(2-ethylhexyl)phthalate Carbon Disulfide Silver	50,000 500 5,000
PPE-02 (MF3SH9)	1,695	Mercury Silver	5×10^8 5,000
SW-04 (MF3SH7/MF3SH6)	1,945	Arsenic Mercury	5×10^4 5×10^8
SW-03 (MF3SH4/MF3SH5)	2,135	Mercury Silver	5×10^8 5,000
PPE-01 (MF3SH3/MF3SH2)	2,285	Arsenic Mercury Silver	5×10^4 5×10^8 5,000
SW-02 (MF3SG4)	2,375	Arsenic Mercury	5×10^4 5×10^8
SW-01* (SED-01-03-51)	2,475	Arsenic Bis(2-ethylhexyl)phthalate	5×10^4 50,000

*SW-01 is the farthest downstream sample location.

-Closed Fisheries

No fisheries within the surface water pathway have been closed due to contamination from the USOR site.

-Benthic or Other Tissue

No benthic or other tissue samples have been collected from the surface water pathway.

4.5.1 Food Chain Individual

Fishing is documented within the TDL off the N. Richey Street bridge (Ref. 6, p. 105; Ref. 17; Attachment A, Figure A-3). At this location, Vince Bayou is fished for Red Fish, Trout, Alligator Gar, Bass, and Catfish all of which are consumed (Ref. 3, p.1; Ref. 6, p. 105; Ref. 17, pp. 1-2). This stretch of river is fished for human consumption and is located within the zone of contamination, as Level II concentrations of arsenic, cobalt, manganese, mercury, silver, and vanadium are documented in discharges, surface water, and/or sediment samples located within this fishery to sample location (SW-01) (see Section 4.1.2.1.1; Figure A-5 of Attachment A).

Fishery	Type of Surface Water Body	Reference(s)
Vince Bayou	Small to Moderate stream	Ref. 31

An observed release by chemical analysis and an observed release by direct observation are established to the surface water migration pathway (See Section 4.1.2.1.1 of the HRS). Since this information documents Level II fisheries within the target distance limit, a food chain individual value of 45 was assigned (Ref. 1, Section 4.1.3.3.1; Ref. 6, p. 105; Ref. 17, pp. 1-2)).

Food Chain Individual Factor Value: 45

4.5.2 Population

4.5.2.1 Level I Concentrations

Level I concentrations have not been established as fish tissue samples have not been collected. Therefore, the Level I concentrations factor value receives an assigned value of 0.

Level I Concentrations Factor Value: 0

4.5.2.2 Level II Concentrations

Identity of Fishery	Annual Production (pounds)	References	Human Food Chain Population Value
Vince Bayou	> 0 but unknown	Ref. 1, Tables 4-13, 4-18; Ref. 17, pp. 1-2	0.03

The zone of Level II contamination in Vince Bayou extends 2,475 feet from PPE-06A (the most upgradient PPE) to the farthest downstream sample station, SW-01 (Section 4.1.2.1.1; Ref. 34, pp. 1-2). Vince Bayou is fished for Red Fish, Trout, Alligator Gar, Bass, and Catfish and these fish are caught for human consumption (Ref. 6, p. 105; Ref. 17, pp. 1-2). This stretch of Vince Bayou is fished for human consumption and is located within the zone of contamination, as Level II concentrations of arsenic, cobalt, manganese, mercury, silver, and vanadium, are documented in discharges, surface water, and/or sediment samples located within this fishery (as shown in Section 4.2.1 of this report) (Ref. 17, pp. 1-2; Figure A-5 of Attachment A). Specific production data from the zone of contamination are not available; therefore, a production estimate of greater than 0 pounds per year will be used for the annual production rate. A human food chain population value of 0.03 is assigned from Table 4-18 of the HRS (Ref. 1, Table 4-18, Sec. 4.1.3.3.2.2).

Level II Concentrations Factor Value: 0.03

4.5.2.3 Potential Human Food Chain Contamination

Identity of Fishery	Annual Production (pounds)	Type of Surface Water Body	Average Annual Flow	Reference	Population Value (P_i)	Dilution Weight (D_i)	P_i x D_i
Vince Bayou downstream of SW-01	>0, but unknown	Small to Moderate stream	10 cfs to 100 cfs	Ref. 1, Tables 4-13, 4-18; Ref. 17, pp. 1-2; Ref. 31, pp. 1-3	0.03	0.1	0.003
Houston Ship Channel (Buffalo Bayou /San Jacinto River)	>0, but unknown	Large Stream to River	>1,000 cfs to 10,000 cfs	Ref. 1, Tables 4-13, 4-18; Ref. 36, p. 1; Ref. 37, pp. 1-2	0.03	0.001	0.00003

Note:

cfs = cubic feet per second.

Vince Bayou is fished for Red Fish, Trout, Alligator Gar, Bass, and Catfish and these fish are caught for human consumption (Ref. 6; p. 105; Ref. 17, pp. 1-2). Stream reaches within Vince Bayou and portions of the Houston Ship Channel within the TDL are subject to potential human food chain contamination, as fish are caught for human consumption (Ref. 17, pp. 1-2; Ref. 37, pp. 1-2). Data to estimate pounds of fish caught annually for Vince Bayou downstream of SW-01 and the Houston Ship Channel are not available; however, because these water bodies are fished for human consumption, the annual production is known to be greater than zero (Ref. 17). As such, a human food chain population value of 0.03 is assigned from Table 4-18 of the HRS (Ref. 1, Table 4-18). The dilution weight for Vince Bayou and the Houston Ship Channel (Buffalo Bayou) were based on the average annual flow data collected by the USGS (Ref. 31, pp. 1-3; Ref. 36, p. 1). Based on the stream flow, Vince Bayou, according to Table 4-13 of the HRS, is classified as a small to moderate stream and receives an assigned dilution weight of 0.1 (Ref. 1, Table 4-13).

Vince Bayou - Product of P_i x D_i = 0.03 x 0.1

Product of P_i x D_i: 0.003

The Houston Ship Channel, according to Table 4-13 of the HRS, is classified as a large stream to river and receives an assigned dilution weight of 0.001 (Ref. 1, Table 4-13).

Houston Ship Channel - Product of P_i x D_i = 0.03 x 0.001

Product of P_i x D_i: 0.00003

(Sum of Products of P_i x D_i)/10: 0.000303

4.6 ENVIRONMENTAL THREAT

4.6.1 WASTE CHARACTERISTICS

Evidence of contamination associated with Sources 1 through 7 has been established based on chemical analyses of samples collected from these sources (refer to the Attribution section and Section 2.2 for each source). Arsenic, barium, cobalt, manganese, mercury, silver, and vanadium were detected in sediment samples collected in Vince Bayou, establishing an observed release (see Section 4.1.2.1.1).

4.6.1.1 Toxicity/Persistence/Bioaccumulation

Hazardous Substance	Source Number	Ecotoxicity Factor Value	Persistence[1] Factor Value	Ecosystem Bioaccumulation Potential Factor Value Fresh[2]	Ecosystem Bioaccumulation Potential Factor Value Salt[2]	Ecotoxicity/ Persistence/ Bioaccumulation Factor Value	Reference
Arsenic	3,4,7,OR	100	1	5,000	500	5×10^5	Ref. 2, p.1
Bis(2-ethylhexyl) Phthalate	2,4,6,OR	1,000	1	50,000	5,000	5×10^7	Ref. 2, p. 2
Cobalt	1,4,5,6,OR	0	1	5,000	5,000	0	Ref. 2, p. 3
Lead	3,4,5,6,OR	1,000	1	50,000	5,000	5×10^7	Ref. 2, p. 8
Manganese	1,2,4,5,6,7 OR	0	1	50,000	50,000	0	Ref. 2, p. 8
Mercury	3,6,OR	10,000	1	50,000	50,000	5×10^8	Ref. 2, p. 8
2-Methyl-naphthalene	1,2,4,5,6, OR	1000	0.4000	50,000	50,000	2×10^7	Ref. 2, p. 9
Naphthalene	1,2,3,4,5,6 OR	1,000	0.4000	50,000	5,000	2×10^7	Ref. 2, p. 9
Silver	3,4,OR	10,000	1	50	50,000	5×10^8	Ref. 2, p. 10
Vanadium	3,4,5,6,7,OR	0	1	500	500	0	Ref. 2, p. 11

Notes:
OR – Observed Release

[1] The surface water category that includes rivers, oceans, coastal tidal waters, and great lakes was utilized to assign the hazardous substances persistence factor value (Ref. 1, Sec. 4.1.2.2.1.2). The persistence values were assigned for a river according to the January 2004 Superfund Chemical Data Matrix (SCDM) table (Ref. 2).
[2] Bioaccumulation factor values are assigned from the SCDM (Ref. 2), for both water body types "Fresh Water" and "Salt Water" in which the wetlands are located. The data that yielded the higher factor value was assigned to the Bioaccumulation Factor Value of the hazardous substance (Ref. 1, Sect. 4.1.3.2.1.3).

Toxicity/Persistence/Bioaccumulation Factor Value: 5×10^8

4.6.1.2 Hazardous Waste Quantity

Source No.	Source Hazardous Waste Quantity Value	Containment			
		Ground Water	Surface Water	Gas	Air Particulate
1	33.896	NE	9	NE	NE
2	1,173.333	NE	10	NE	NE
3	48.889	NE	10	NE	NE
4	2,605.912	NE	10	NE	NE
5	48.216	NE	9	NE	NE
6	67.337	NE	10	NE	NE
7	1,813.333	NE	10	NE	NE
TOTAL	5,790.916				

A hazardous waste quantity of 5,790.916 is estimated for sources at the USOR site which when applied in HRS Table 2-6 yields a pathway hazardous waste quantity of 100. Also, as documented in Sections 4.1.2.1.1 of the HRS and 4.7.2 of this HRS documentation record, a wetland is subject to Level II concentrations; therefore, a minimum value of 100 can be assigned for the hazardous waste quantity factor value (Ref. 1, Section 2.4.2.2).

Hazardous Waste Quantity Factor Value = 100

4.6.1.3 Waste Characteristics Factor Category Value

Ecotoxicity/Persistence Factor Value: 10,000
Hazardous Waste Quantity Factor Value: 100
Bioaccumulation Potential Factor Value: 50,000

(Ecotoxicity/Persistence Factor Value) x (Hazardous Waste Quantity Factor Value) = 1×10^6
(Ecotoxicity/Persistence Factor Value x Hazardous Waste Quantity Factor Value) x
(Bioaccumulation Potential Factor Value) = 5×10^{10}
(Ref. 1, Section 4.1.3.2.3).

A hazardous waste quantity factor of 100 is assigned according to HRS Section 2.4.2.2. From Reference 2 and Table 4-12 of the HRS, mercury has an ecotoxicity/persistence value of 10,000 and a bioaccumulation potential factor of 50,000. The waste characteristics factor category value from Reference 1, Table 2-7 for a waste characteristics product of 5×10^{10} is 320.

Hazardous Waste Quantity Assigned Value: 100

Waste Characteristics Factor Category Value: 320

4.7 SENSITIVE ENVIRONMENTS

4.7.1 Level I Concentrations

No Level I concentrations have been documented; therefore, Level I concentrations were not evaluated.

4.7.2 Level II Concentrations

Wetlands

The area of Level II contamination extends 2,475 feet from PPE-06A in Vince Bayou to the farthest downstream sample location, SW-01 (Ref. 1, Section 4.1.2.1.1; Ref. 34). A total of approximately 1,720 linear feet of wetland frontage contiguous to Vince Bayou was determined to be affected by Level II concentrations (Ref. 19, pp. 1-5; Ref. 20, pp. 1-2). Since Vince Bayou is a surface water body with discernible flow, the wetlands on opposite banks of the stream are considered separate wetlands. The total length of wetlands determined in accordance with Sections 4.1.4.3.1.1 and 4.1.4.3.1.2 of the HRS (Ref. 1) and was calculated by adding together the individual lengths on each bank of the surface water body (550 feet + 840 feet+ 330 feet = 1,720 feet) (Ref. 1, Sections 4.1.4.3.1.1 and 4.1.4.3.1.2; Ref. 20, pp. 1-2).

According to the National Wetlands Inventory (NWI) Map of the area, updated in 2006, the wetlands contiguous to Vince Bayou with Level II contamination are classified as estuarine, intertidal, emergent wetland, persistent, irregularly flooded (E2EM1P) (Ref. 19, pp. 1-13). These wetlands meet the 40 CFR 230.3 definition of a wetland.

Total Level II Wetland Frontage along Vince Bayou = 1,720 feet (0.3257 miles)

Wetland Value (Ref. 1, Table 4-24): 25

Level II Concentrations Factor Value: 25

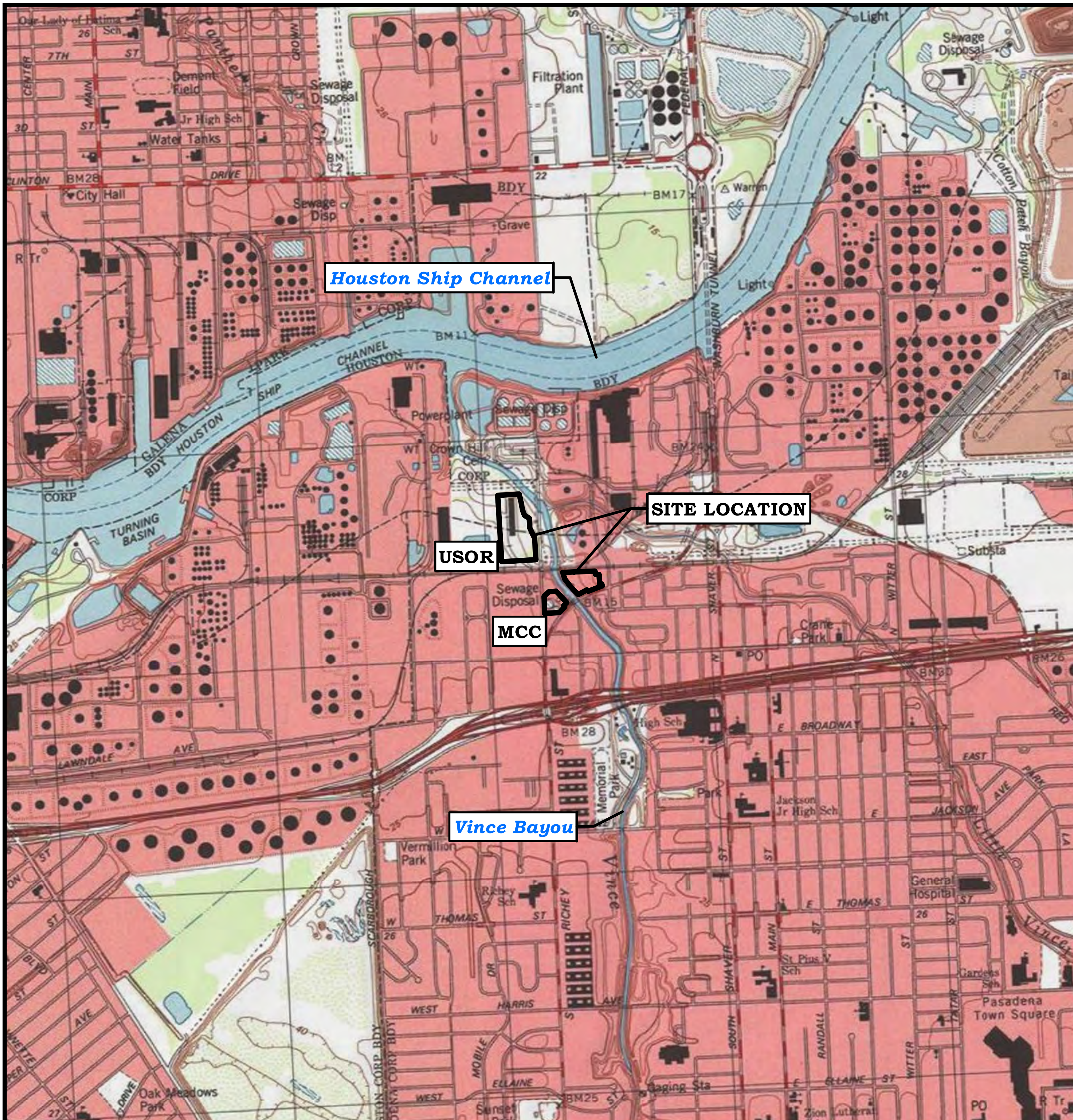
5.0 <u>SOIL EXPOSURE PATHWAY SCORE</u> - NOT SCORED

The soil exposure pathway will not be scored because it is not expected to contribute significantly to the site score. Further, the site score already exceeds 28.50 based only on the evaluation of the surface water pathway.

6.0 <u>AIR MIGRATION PATHWAY SCORE</u> - NOT SCORED

The air migration pathway will not be scored because it is not expected to contribute significantly to the site score. Further, the site score already exceeds 28.50 based only on the evaluation of the surface water pathway.

ATTACHMENT A



0 2,000 4,000

SCALE IN FEET

LEGEND

SITE LOCATION

N

US EPA REGION 6
START- 3

FIGURE A-1
SITE LOCATION MAP
US OIL RECOVERY
PASADENA, HARRIS COUNTY, TEXAS

DATE	PROJECT NO	SCALE
APR. 2011	20406.012.019.0612.01	AS SHOWN

TDD NO: TO-0019-11-01-01
CERCLIS: TXN000607093
SOURCE: USGS TOPOGRAPHIC QUAD MAPS

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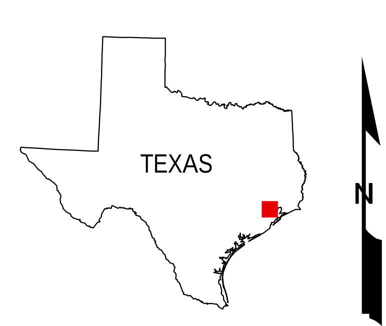
0 80 160
SCALE IN FEET

LEGEND

- CULVERT
- SOURCE 1 OVERLAND FLOW PATH
- SOURCE 2 OVERLAND FLOW PATH
- SOURCE 3 OVERLAND FLOW PATH
- SOURCE 5 OVERLAND FLOW PATH
- SOURCE 6 OVERLAND FLOW PATH
- SOURCE 7 OVERLAND FLOW PATH
- SOURCE 8 OVERLAND FLOW PATH
- FENCED PROPERTY BOUNDARY



TDD NO: TO-0019-11-01-01
CERCLIS: TXN000607093
SOURCE: HARRIS COUNTY APPRAISAL DISTRICT

US EPA REGION 6
START-3

FIGURE A-2A
US OIL RECOVERY PROPERTY LAYOUT MAP
400 N. RICHEY STREET PROPERTY
US OIL RECOVERY
PASADENA, HARRIS COUNTY, TEXAS

DATE	PROJECT NO	SCALE
MAY, 2011	20406.012.019.0612.01	AS SHOWN

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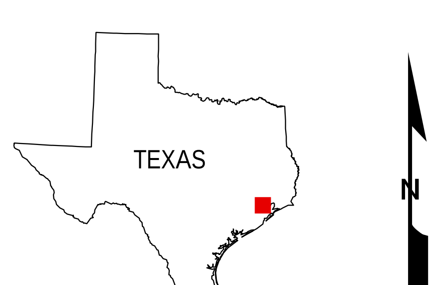
Legend

- APPROXIMATE PIPELINE LOCATION
- SOURCE 4 OVERLAND FLOW PATH
- FENCED PROPERTY BOUNDARY

0 90 180
SCALE IN FEET



US EPA REGION 6
START-3

FIGURE A-2B
MCC RECYCLING PROPERTY LAYOUT MAP
200 N. RICHEY STREET PROPERTY
US OIL RECOVERY
PASADENA, HARRIS COUNTY, TEXAS

DATE	PROJECT NO	SCALE
MAY, 2011	20406.012.019.0612.01	AS SHOWN

TDD NO: TO-0019-11-01-01
CERCLIS: TXN000607093
SOURCE: HARRIS COUNTY APPRAISAL DISTRICT

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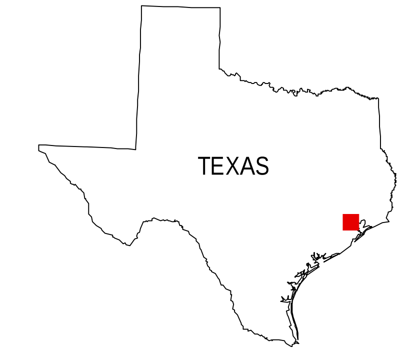


LEGEND

- PROBABLE POINT OF ENTRY
- OVERLAND FLOW DIRECTION
- SITE BOUNDARY

N

0 240 480

SCALE IN FEET

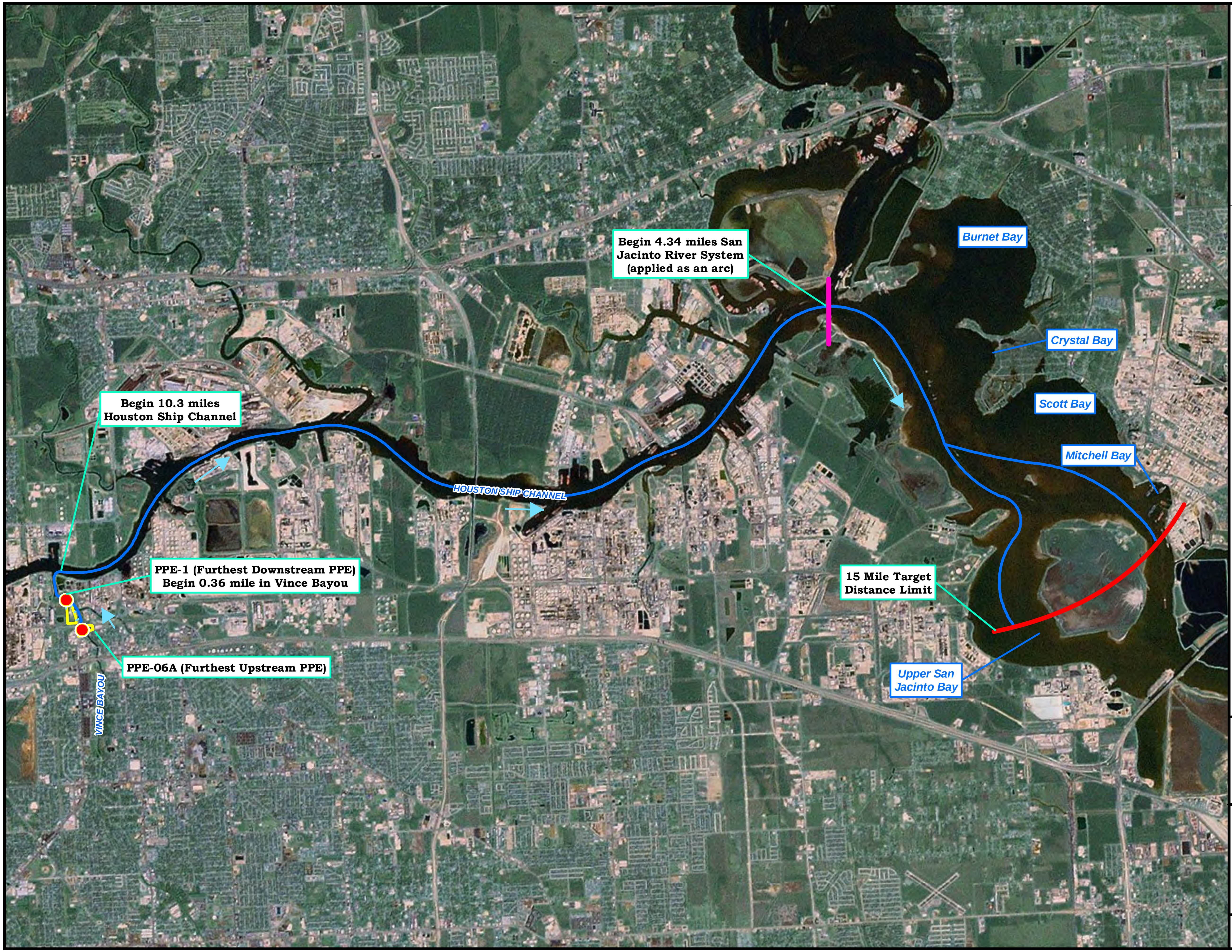
TDD NO: TO-0019-11-01-01
CERCLIS: TXN000607093
SOURCE: HARRIS COUNTY APPRAISAL DISTRICT
AERIAL: BING IMAGE SERVICE

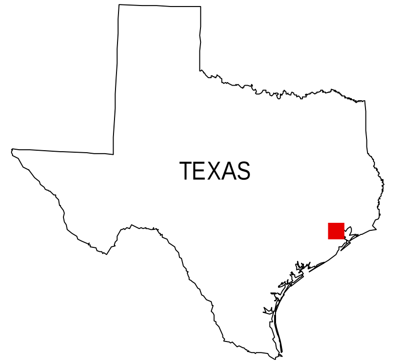
US EPA REGION 6
START- 3

FIGURE A-3
SURFACE WATER PATHWAY MAP
US OIL RECOVERY
PASADENA, HARRIS COUNTY, TEXAS

DATE	PROJECT NO	SCALE
MAR 2011	20406.012.019.0612.01	AS SHOWN

File: L:\20406_START3_R6\US_OIL_RECOVERY\GIS\FIGURE_A-3_SURFACE_WATER_PATHWAY_MAP.mxd 4/8/2011 4:12:39 PM bondp





LEGEND

PROBABLE POINT OF ENTRY SAMPLE

FLOW DIRECTION

SITE BOUNDARY

N

0 1 2

Miles

TDD NO: TO-0019-11-01-01
CERCLIS: TXN000607093
SOURCE: HARRIS COUNTY APPRAISAL DISTRICT

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

US EPA REGION 6
START- 3

FIGURE A-4
15 MILE TARGET DISTANCE LIMIT MAP
US OIL RECOVERY
PASADENA, HARRIS COUNTY, TEXAS

DATE	PROJECT NO	SCALE
APR. 2011	20406.012.019.0612.01	AS SHOWN

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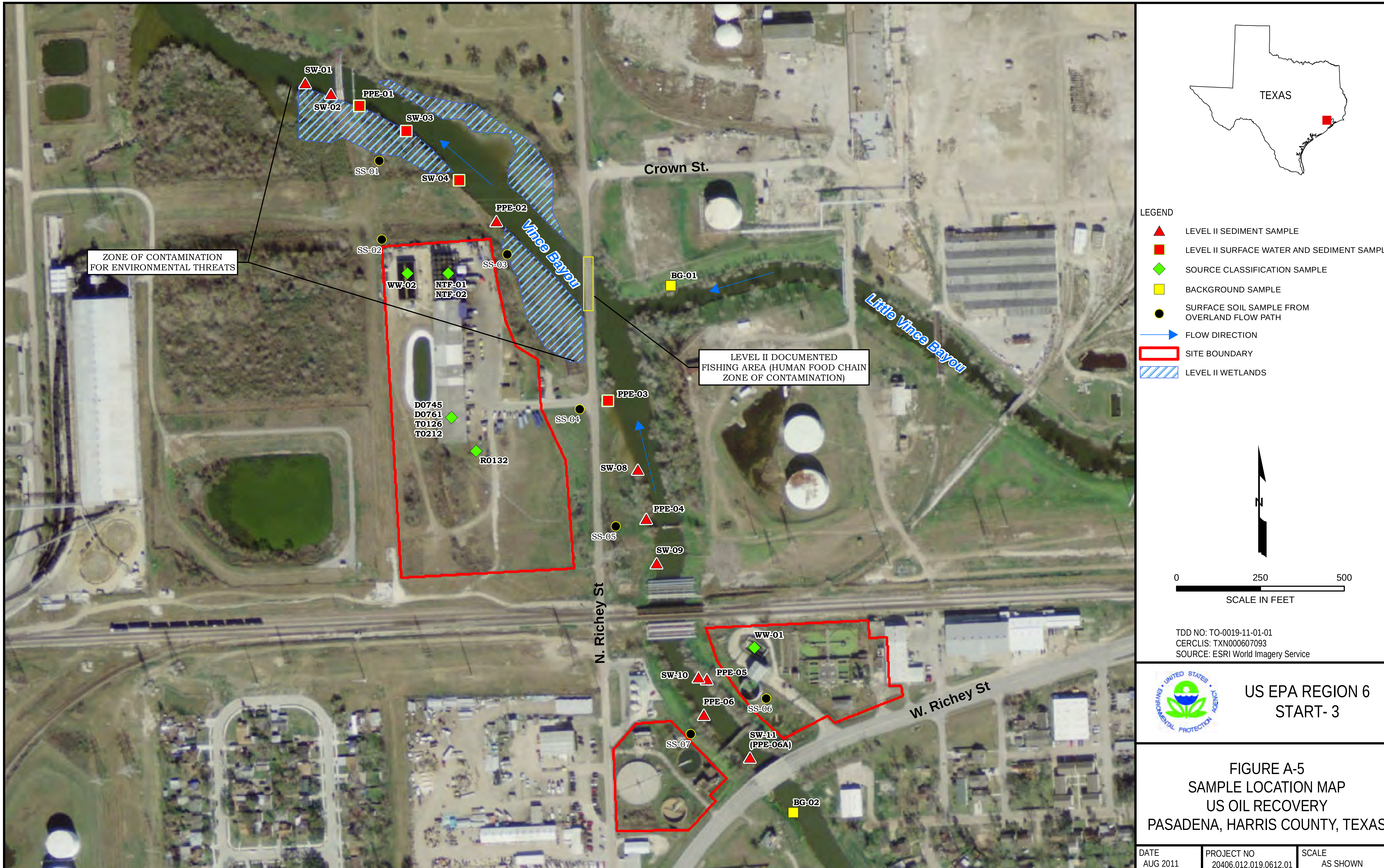

TDD NO: TO-0019-11-01-01
CERCLIS: TXN000607093
SOURCE: ESRI World Imagery Service

US EPA REGION 6
START- 3

FIGURE A-5
SAMPLE LOCATION MAP
US OIL RECOVERY
PASADENA, HARRIS COUNTY, TEXAS

DATE	PROJECT NO	SCALE
AUG 2011	20406.012.019.0612.01	AS SHOWN

File: L:\20406_START3_R6\US_OIL_RECOVERY\GIS\FIGURE_A-5_SAMPLE_LOCATION_MAP.mxd 8/16/2011 11:09:18 AM bondp